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INDEX

TO

EXECUTIVE DOCUMENTS

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DURING

THE FIRST SESSION OF THE THIRTY-FIRST CONGRESS,

1849–'50.

IN FOURTEEN VOLUMES.

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INDEX

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IN FOURTEEN VOLUMES.

Volume 1 *contains*	-	*No.* 1, *part* 1.
Volume 2 *contains*	-	*No.* 1, " 2.
Volume 3 *contains*	-	*No.* 1, " 3.
Volume 4 *contains*	-	*No.* 2.
Volume 5 *contains*	-	*No.* 3 *to* 5 *inclusive.*
Volume 6 *contains*	-	*No.* 6 *to* 28, *except Nos.* 15 *and* 16.
Volume 7 *contains*	-	*No.* 15, *part* 1.
Volume 8 *contains*	-	*No.* 15, " 2.
Volume 9 *contains*	-	*No.* 18.
Volume 10 *contains*	-	*No.* 29 *to* 48, *except No.* 39.
Volume 11 *contains*	-	*No.* 39, *part* 1.
Volume 12 *contains*	-	*No.* 39, " 2.
Volume 13 *contains*	-	*No.* 49 *to* 63 *inclusive.*
Volume 14 *contains*	-	*No.* 64 *to* 82 *inclusive.*

A.

	Vol.	No.	Page.
Academy at West Point, for 1849. Report of the board of visitors of the Military - - - -	1	1	235
Adjutant General of the army, with returns, position, and distribution of the troops, in 1849. Report of the	1	1	179
Admiralty against foreign vessels entering the ports of the United States, &c. Correspondence relative to suits instituted in the courts of - -	14	78	1
Africa, and the annual cost of that squadron. Report of the annual number of deaths in the United States squadron on the coast of - - - - -	10	40	1
Agriculture, agricultural statistics, meteorology, &c. Report of the Commissioner of Patents, with a general view of American - - - - -	8	15	1
(See table of contents, at page 3, *of above.)*			
American vessels by British ships of war. Correspondence relative to the searching of - - - -	14	66	1

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INDEX

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BY ORDER OF THE SENATE OF THE UNITED STATES,

DURING THE

FIRST SESSION OF THE THIRTY-FIRST CONGRESS—1849-'50.

IN FOURTEEN VOLUMES.

Volume 1 *contains*	-	*No.* 1, *part* 1.
Volume 2 *contains*	-	*No.* 1, " 2.
Volume 3 *contains*	-	*No.* 1, " 3.
Volume 4 *contains*	-	*No.* 2.
Volume 5 *contains*	-	*No.* 3 *to* 5 *inclusive.*
Volume 6 *contains*	-	*No.* 6 *to* 28, *except Nos.* 15 *and* 16.
Volume 7 *contains*	-	*No.* 15, *part* 1.
Volume 8 *contains*	-	*No.* 15, " 2.
Volume 9 *contains*	-	*No.* 18.
Volume 10 *contains*	-	*No.* 29 *to* 48, *except No.* 39.
Volume 11 *contains*	-	*No.* 39, *part* 1.
Volume 12 *contains*	-	*No.* 39, " 2.
Volume 13 *contains*	-	*No.* 49 *to* 63 *inclusive.*
Volume 14 *contains*	-	*No.* 64 *to* 82 *inclusive.*

A.

	Vol.	No.	Page.
Academy at West Point, for 1849. Report of the board of visitors of the Military - - - -	1	1	235
Adjutant General of the army, with returns, position, and distribution of the troops, in 1849. Report of the	1	1	179
Admiralty against foreign vessels entering the ports of the United States, &c. Correspondence relative to suits instituted in the courts of - -	14	78	1
Africa, and the annual cost of that squadron. Report of the annual number of deaths in the United States squadron on the coast of - - - - -	10	40	1
Agriculture, agricultural statistics, meteorology, &c. Report of the Commissioner of Patents, with a general view of American - - - - -	8	15	1
(See table of contents, at page 3, *of above.)*			
American vessels by British ships of war. Correspondence relative to the searching of - - -	14	66	1

	Vol.	No.	Page.
Appropriations for the service of the State Department, including foreign missions, during the year 1849. Statements showing the disbursements of -	10	30	2
Appropriations for the naval service for the fiscal year ending 30th June, 1849. Statement of - -	1	1	761
Appropriations for the naval service during the year ending 30th June, 1849. Statement of transfers of -	6	7	1
Appropriations and expenditures for the service of the War Department during the fiscal year ending June 30, 1849. Statement of - - -	6	10	1
Arms, percussion powder, and caps in France, Belgium, Holland, and England. Report of Brevet Major Hagner, in relation to the mode of manufacturing -	1	1	374
Armories and arsenals during the fiscal year ending 30th June, 1849. Statement of the principal operations at the - - - - - -	1	1	362
Armories, and the number of arms and appendages made and repaired during the year ending 30th June, 1849. Statement of the expenses of the national	6	27	1
Army in 1849, (part 1.) Report of Major General Scott on the state and operations of the - -	1	1	98
Army, with returns, position, and distribution of the troops in 1849, (part 1.) Annual report of the Adjutant General of the - - - -	1	1	178
Army for the year 1849. Annual report of the Quartermaster General of the - - - - -	1	1	192
Army operations in New Mexico, in 1849. Report of the	1	1	104
Army operations in Florida, in 1849. Report of the -	1	1	116
Army operations in Texas, in 1849. Report of the -	1	1	138
Army for 1849. Annual report of the Paymaster General of the - - - - - - -	1	1	198
Army for 1849. Annual report of the Commissary General of the - - - - - - -	1	1	204
Army for 1849. Annual report of the Surgeon General of the - - - - - - -	1	1	206
Army of the United States in Texas, and the adjacent Mexican states on the Rio Grande, accompanied by astronomical observations, and descriptive and military memoirs of the country. Report of Secretary of War, with a map showing the operations of the - - - - - -	10	32	1
Army operations on the Rio Grande. Report of the Secretary of War of the - - - - -	14	73	1
Arsenals and armories during the year ending 30th June, 1849. Statement of the principal operations at the	1	1	362
Arts and manufactures for the year 1849. Report of the Commissioner of Patents in relation to - -	7	15	1
Assistant Postmaster General. (See *Postmaster General.*)			
Auditor of the Post Office Department, accompanying the annual report of the Postmaster General. Report of the - - - - - - -	1	1	787

	Vol.	No.	Page.
Auditor's office during the year ending 30th September, 1849. Abstract of expenditures under the head of contingent expenses of the navy, as settled at the Fourth - - - - - - - -	1	1	764
Auditor of the Treasury, with copies of accounts of disbursements for the benefit of the Indians. Report of the Second - - - - - - -	10	41	1
Auditor of the Treasury of the disbursement of moneys, &c., for the benefit of the Indians. Report of the Second . - - - - - - -	5	4	1
Auditor of the Treasury, with a statement of the claims of the Cherokee nation of Indians, according to the principles established by the treaty of August, 1846. Report of the Second Comptroller and Second - - - - - - - -	6	6	1
Austria. Correspondence with the agent employed to visit Hungary during the recent war between that country and - - - - - - -	10	48	1

B.

Black river. (See *River*.)			
Bodisco, the Russian minister. Report in relation to the measures taken by the Secretary of State on the memorial of the great grandnephew and attorney of the heirs of General Kosciusko against Alexandre de - - - - - - -	13	59	1
Botanical specimens collected in the primitive region south of Lake Superior. Catalogue of - - - -	3	1	876
Boundary line between the United States and New Mexico. Operations of the commission to run and mark the - - - - - - - -	10	34	1
Boundary line between the British and French possessions in North America, as fixed by the treaty of Utrecht. Extract of a letter from Mr. Everett, United States minister at London, to Mr. Webster, Secretary of State, relative to the - - - - -	14	71	1
Bounty land warrants. (See *Land*.)			
Brazos de St. Jago. Message of the President relative to the commerce of the port of - - - - -	14	69	1
British chargé d'affaires for Chili to the lady of the American consul for Valparaiso. Correspondence in relation to the resentment of an indignity offered by the - - - - - - - -	6	16	1
British vessels between the Atlantic and Pacific ports of the United States, and the granting of American registers to British built vessels purchased by citizens of the United States; also to an increase of duty on British produce or manufactures. Correspondence with the British minister relative to the trade in - - - - - - - - -	10	36	1

	Vol.	No.	Page.
British government for slaves deported in violation of the treaty of September 3, 1783. Report of claims of American citizens against the - - -	10	46	1
British ships of war. Correspondence in relation to the searching of American vessels by - -	14	66	1
British and French possessions in North America. Extract of a letter from Mr. Everett, United States minister at London, to Mr. Webster, Secretary of State of the United States, in relation to the boundary line between the - - -	14	71	1
Bronno Bronski, in relation to an improved variety of silk-worms which he desires to have introduced into the United States. Memorial of Count de -	13	53	1
Bureau of Construction, &c., relative to contracts with Mr. R. L. Stevens for the construction of a war steamer, shot and shell-proof. Report of the chief of the - - - - - - -	1	1	446
Bureau of Construction, Equipment, and Repairs. Report and detailed estimates of the - - -	1	1	460
Bureau of Navy Yards and Docks. Report and detailed estimates of the - - - - -	1	1	554
Bureau of Ordnance and Hydrography. Report and detailed estimates of the - - - - -	1	1	548
Bureau of Provisions and Clothing. Report and detailed estimates of the - - - - -	1	1	706
Bureau of Medicine and Surgery. Report and detailed estimates of the - - - - -	1	1	743
Bureau of Yards and Docks. Abstract of offers for furnishing articles coming under the cognizance, under act of 3d March, 1843, of the - - -	1	1	664
Bureaus of the War Department during the fiscal year ending 30th June, 1849. Statement of contingent expenses of the several offices and - -	6	9	1

C.

California and New Mexico. Message from the President of the United States communicating information and correspondence in relation to - - -	9	18	1
California. Copy of the constitution of - - -	6	28	1
California, &c., accompanied by a report from Gilbert Rodman, special agent. Report of the Secretary of the Treasury, with correspondence, relating to the security and collection of the revenue in - -	14	82	1
California; and also in relation to the condition of civil affairs in Oregon. Message of the President of the United States, with a report of the Secretary of State, communicating further information in relation to the formation of a State government in -	13	52	1

	Vol.	No.	Page.
California and Oregon. Reports of Generals Smith and Riley, Lieutenants Talbot and Ord, Mr. Tyson, and Professor Frazer, in relation to the geology and topography of - - - - -	10	47	1
Census board, of its operations since it was constructed. Report of the - - - - - - -	1	1	851
Census board, in answer to a resolution of the Senate of March 18, 1850, in relation to contracts for paper, &c. Report of the - - - - -	10	38	1
Cherokee Indians. (See *Indians.*)			
Chief of the Bureau of Construction, &c. (See *Bureau.*)			
Chief Engineer. (See *Engineer.*)			
China, under the act to carry into effect certain provisions of the treaties between the United States and China, and the Ottoman Porte. Report of the Commissioner to - - - - - -	14	72	2
Choctaw certificates. (See *Land.*)			
Clerks. (See *Executive departments.*)			
Coast at the mouth of the Rio Grande. Report of Lieut. Webster of a survey of the gulf - - - -	14	65	1
Coast survey, showing the progress of that work during the year ending November, 1849. Report of the superintendent of the - - - - -	5	5	1
Commerce and navigation of the United States for the year ending 30th June, 1849. Report of the Register of the Treasury, of the - - -	5	3	1
Commerce of the lakes. (See *Lakes.*)			
Commissary General of the army for 1849. Annual report of the - - - - - - -	1	1	204
Commissary General of Subsistence during the year 1849. Report of contracts by the - - - -	6	26	37
Commissioner of Indian Affairs. Annual report of the	2	1	937
Commissioner of Pensions. Annual report of the -	2	1	1177
Commissioner of the General Land Office on the operations of that office during the year 1849. Report of the - - - - - - -	2	1	17
Commissioner to run and mark the boundary between the United States and Mexico, parts 1 and 2. Correspondence relative to the operations of the -	10	34	1
Commissioner of the General Land Office in relation to the public lands in the Milwaukie land district. Report of the - - - - - -	10	45	1
Commissioner of the General Land Office relative to the land claimants of the land surrounding the Hot Springs of Arkansas. Report of the - -	14	70	1
Comptroller and Second Auditor of the Treasury, with a statement of the claims of the Cherokee nation of Indians, according to the principles established by the treaty of August, 1846. Report of the Second	6	6	1

	Vol.	No.	Page.
Constitution adopted by the inhabitants of New Mexico, with a digest of the votes for and against it; also, a letter to the late President Taylor from Manuel Alvarez. Copy of the	14	74	1
Consul at Valparaiso. Correspondence in relation to the resentment of an indignity offered at Lima by the British chargé for Chili, to the lady of the American	6	16	1
Contingent expenses. (See *Expenditures.*)			
Contracts authorized by the Treasury Department, &c., in 1849. Statement of	10	31	1
Contracts under the cognizance of the Bureau of Construction, Equipment and Repair, from December 4, 1848, to November 14, 1849. List of	1	1	470
Contracts made by the Bureau of Ordnance and Hydrography, for the year ending 30th June, 1849. Statement of	1	1	553
Contracts made and received by the Bureau of Yards and Docks, since November 4, 1848. List of	1	1	580
Contract for furnishing annual supplies coming under the cognizance of the Bureau of Yards and docks, under act of March 3, 1843. Abstract of offers to	1	1	664
Contracts with R. L. Stevens for the construction of a war steamer to be shot and shell-proof. Report of the Chief of the Bureau of Construction, &., in relation to the	1	1	446
Contract for furnishing navy supplies, transportation of stores, &c. Abstracts of proposals to	1	1	714
Contracts made by the Bureau of Provisions and Clothing for supplies for the navy during the fiscal year ending June 30, 1850. Statement of	1	1	736
Contracts made under the authority of the War Department during the year ending June 30, 1849. Statements by the Quartermaster, Commissary, and Surgeon Generals, and Colonels of Engineers, Topographical Engineers, and Ordnance	6	26	3, 37, 41, 47, 49, 51
Courts of admiralty against foreign vessels entering the ports of the United States. Correspondence relative to suits instituted in	14	78	1
Cuba, or some of the provinces of Mexico. Proclamation of the President of the United States, and correspondence in relation to an armed expedition for the invasion of	1	1	17
Cuba. Correspondence of the several heads of departments, in relation to alleged revolutionary movements in	13	57	1
Cumberland dam. Report and estimate of Lieutenant Colonel Long, in relation to the repairs of the	6	14	1

	Vol.	No.	Page.
D.			
Deaths in the United States squadron on the coast of Africa, and the annual cost of that squadron. Statement of the number of - - - - -	16	40	1
Defences. (See *Frontier*.)			
Denmark. Correspondence with the Danish legation, in relation to fitting out, in New York, the American steamer "the United States," with intent, as alleged, to be employed in the service of the central government of Germany, in its war against -	1	1	49
Disbursements of the appropriations for the service of the State Department, including foreign missions, during the year 1849. Statement of the - -	10	30	1
Disbursements made for the benefit of the Indians. Statements of - - - - - - - -	10	41	1
Dismissions. (See *Navy*.)			
District of Columbia. Report of the annual expenses, for the last ten years, of the judiciary of the - -	13	54	1
Duty on British produce or manufactures. Correspondence with the British minister in relation to an increase of - - - - - - -	10	36	1
E.			
Electro-magnetic power as a mechanical agent for the purposes of navigation and locomotion. Report of Professor Charles G. Page. relative to his experiments for testing the capacity, &c., of the -	1	1	445
Electro-magnetic power as a mechanical agent for the purposes of navigation and locomotion. Report of Charles G. Page, relative to - - - -	13	61	1
El Paso, from Fort Smith to Santa Fe, by Captain Marcy; of an expedition into the Navajo country, by Lieutenant Simpson; and of an expedition on the western frontier of Texas. Reconnaissances of routes, by Brevet Lieutenant Colonel Johnson, and others, from San Antonio to - - - - -	14	64	1
Engineers, with a copy of P. T. Tyson's report on the geology of California. Report of the Bureau of Topographical - - - - -	10	47	3
Engineers, in relation to the commerce of the lakes, American tonnage engaged, and the number of seamen employed thereon, &c. Report of the Bureau of Topographical - - - -	10	48	1
Engineer of the army, for 1849. Annual report of the Chief - - - - - - - -	6	26	47
	1	1	200
Engineers, with estimates, for 1849. Annual report of the Colonel of the Corps of Topographical -	6	26	49
	1	1	294

	Vol.	No.	Page.
Espy's report in relation to meteorological observations and "rules for mariners." Professor - -	11 12	39	1
Estimates for surveys for frontier defences, military and geographical, northern and northwestern lakes, and the improvement of the habor at Mobile -	1	1	300
Estimates for improvement of rivers and harbors - -	1	1	300
Estimates for construction, repairs, &c., of light houses	1	1	300
Estimates and plans for improving the entrances from Lake Michigan into Maskegon lake, Black and Grand rivers. Report of Bureau of Topographical Engineers, of - - - - -	6	20	1
Estimates for the office of Secretary of the Navy; south west executive building; Bureau of Construction, Equipment, and Repair; Bureau of Ordnance and Hydrography; Bureau of Navy-yards and Docks; Bureau of Provision and Clothing; and Bureau of Medicine and Surgery. Aggregate of - -	1	1	453
Estimates for the office of Secretary of the Navy, and the several bureaus of the Navy Department, for the fiscal year ending June 30, 1851. General -	1	1	455
Estimate for the expenses of the southwest executive building for the fiscal year 1850-'51 - -	1	1	455
Estimate for the support of the navy for the fiscal year ending 30th June, 1851. General - -	1	1	456
Estimate for the support of the marine corps for the fiscal year ending 30th June, 1851. General - -	1	1	457
Estimates for the office of the Secretary of the Navy for the fiscal year ending 30th June, 1851. Detailed	1	1	458
Estimate for the pay of commission and warrant officers of the navy, including the engineer corps, (not on duty,) for the fiscal year ending 30th June, 1851	1	1	458
Estimate for the improvement and repair of buildings and grounds of the naval school at Annapolis for the fiscal year ending 30th June, 1851 - -	1	1	459
Estimate for the transportation of the United States mail, under act of 3d August, 1848, for the fiscal year ending 30th June, 1851 - - - -	1	1	459
Estimate for the Nautical Almanac for the fiscal year of 1850-'51, under act of 3d March, 1849 - -	1	1	459
Estimate for the expenses of the Bureau of Construction, Equipment, and Repairs, for the fiscal year ending June 30, 1851 - - - -	1	1	463
Estimate for the pay of commission, warrant, and petty officers and seamen, including engineer corps, &c., for the fiscal year ending 30th June, 1851 -	1	1	463
Estimate for increase, repairs, armament, and equipment of the navy, and for wear and tear of vessels in commission, including fuel for steamers and the purchase of hemp for the navy, for the fiscal year ending 30th June, 1851 - - - -	1	1	464

	Vol.	No.	Page.
Estimate for the expenditures under the head of "enumerated contingent," for the fiscal year ending June 30, 1851	1	1	464
Estimate for the expenses of the Bureau of Ordnance and Hydrography for the fiscal year ending 30th June, 1851	1	1	549
Estimate for pay of officers on ordnance duty for the year ending 30th Juue, 1851	1	1	549
Estimate of ordnance and ordnance stores, &c., required for the general service of the navy for the year ending 30th June, 1851	1	1	550
Estimate for the support of the Hydrographical Office and National Observatory for the year ending June 30, 1851	1	1	551
Estimate for the support of the Bureau of Yards and Docks for the year ending 30th June, 1851	1	1	568
Estimate for pay of officers attached to the recruiting stations for the year ending 30th June, 1851	1	1	569
Estimate for pay of officers and others at navy yards and stations for the year ending 30th June, 1851	1	1	569
	1	1	569
Estimate for the construction, extension, and completion of works at the several navy-yards, and for the necessary current repairs at the same, for the fiscal year ending 30th June, 1851	1	1	576
Estimate for the Bureau of Yards and Docks for the year ending 30th June, 1851. Statement showing the several sums which make up the amounts of the 1st and 2d items in the general	1	1	577
Estimate for hospitals and magazines	1	1	578
Estimate for the completion of the stone dry dock at New York, and for the completion of the floating drydocks to be built at Kittery, Philadelphia, and Pensacola navy yards	1	1	578
Estimate from the Bureau of Yards and Docks for the year ending 30th June, 1851, in addition to the balances remaining unexpended 1st July, 1850. General	1	1	579
Estimate for that portion of the United States naval service coming under the cognizance of the Bureau of Provisions and Clothing during the year ending 30th June, 1851	1	1	709
Estimate of the expenses of the Bureau of Provisions and Clothing for the fiscal year ending 30th June, 1851	1	1	709
Estimates for its support during the fiscal year ending 30th June, 1851, &c. Report of the Bureau of Medicine and Surgery, with	1	1	743
Estimates for pay and subsistence of officers, pay of non-commissioned officers, musicians, and privates, of the marine corps, and for undrawn rations and clothing, for the year ending 30th June, 1851, including three months' extra pay, under resolution of 10th August, 1848	1	1	756

	Vol.	No.	Page.
Estimates of the expenses of the Quartermaster's department of the marine corps for the year ending 30th June, 1851	1	1	759
Estimates for the mail service, &c., during the year ending 30th June, 1850	1	1	776
Estimate of appropriations for the office of the Commissioner of the General Land Office for the fiscal year ending 30th June, 1851	2	1	65
Estimate of appropriations for the surveying department for the fiscal year ending 30th June, 1851	2	1	66
Estimate by Lieutenant Colonel Long for the repair of the Cumberland dam	6	14	1
Expenditures on account of national armories, and the number of arms, &c., during the year ending 30th June, 1849. Statement of	6	27	2
Expenditures on account of the service of the State Department in 1849. Statement of	10	30	1
Expenditures from the marine hospital fund for the relief of sick and disabled seamen. Statement of	10	31	8
Expenditures, under the head of contingent expenses, as settled and allowed at the Fourth Auditor's office of the Treasury Department. Statement of	1	1	764
Expenditures for contingencies of the various offices and bureaus of the War Department during the fiscal year ending 30th June, 1849. Statements of	6	9	1
Expenditures for the service of the War Department during the fiscal year ending June 30, 1849. Statement of appropriations and	6	10	1
Expenses of the judiciary of the District of Columbia. Report in relation to the	13	54	1

F.

Finances. Annual report of the Secretary of the Treasury on the state of the	4	2	1
First Assistant Postmaster General. (See *Postmaster General.)*			
Florida. Instructions (17th September, 1849) of the Secretaries of War and Interior to Brigadier General Twiggs and S. Spencer, Sub-Indian agent, respecting the removal of the Seminole Indians remaining in	2	1	961
Florida in 1849, (part 1.) Report of military operations in	1	1	116
Florida, during the past year, the area occupied by them, their removal, &c. Correspondence in relation to hostilities committed by the Seminole Indians in	13	49	3
Foreign vessels. (See *Vessels.)*			
Fortifications, and military establishments connected therewith, in 1849. Condition, repairs, &c., of	1	1	209

	Vol.	No.	Page.
Fort Smith, in Arkansas, to Santa Fe, in New Mexico. Report and map, by Lieutenant Simpson, of the route from	6	12	1
Fort Smith to Santa Fe. Report of Captain Marcy's reconnaissance of the route from	14	64	1
Fourth Auditor. (See *Auditor.*)			
Frauds upon the revenue since the act of 1846. Statement of measures adopted to prevent	14	79	1
Franklin, relative to the expedition to the Arctic regions under the command of her husband. Correspondence with the lady of Sir John	6	8	1
Frontier defences. Estimates for inland and Atlantic	1	1	300
G.			
Garcia, from New Orleans, by the Spanish consul at that port. Correspondence relating to the abduction of Rey, *alias*	6	13	1
Geological and mineralogical survey of the United States mineral lands in Michigan, under act of March 1, 1847, by Charles T. Jackson, United States geologist, for the survey of the United States mineral lands in Michigan. Report of the	3	1	371
Geological specimens collected in Messrs. Hubbard and Ives's districts of public surveys in 1846. Catalogue of	3	1	912
Geology and topography of California and Oregon. Reports of Brevet Major General Smith and Brevet Brigadier General Riley, with accompanying reports of Mr. Tyson, Professor Fraser, and Lieutenants Talbot and Ord, in relation to the	10	47	1
German government, and to securing the services of naval officers of the United States in building up the German navy. Correspondence with the minister of the German Empire in relation to the construction of a war steamer at New York, destined, as alleged, for the service of the	1	1	18
Great Britain and the United States in relation to the exchange of mails. Regulations adopted by	1	1	803
Guano. Report respecting commercial privileges extended to citizens of the United States in relation to the trade in Peruvian	13	59	1
Guano. Despatch from Mr. Clay, chargé d'affaires at Lima, respecting Peruvian	14	80	1
Gurley, who was recently sent out by the government to obtain information in respect to Liberia. Report of the Rev. R. R.	14	75	1
H.			
Hagner, in relation to the mode of manufacturing percussion powder and caps, small arms, &c., in France, Belgium, Holland, and England. Report of Brevet Major P. V.	1	1	374

	Vol.	No.	Page.
Harbors and rivers for the year ending 30th June, 1851. Estimates for the improvement of - -	1	1	300
Hardcastle's map of the valley of Mexico. Report of the Secretary of War, communicating Lieutenants Smith and - - - - - -	6	11	1
Hot Springs of Arkansas. (See *Lands.*)			
Hungarian exiles. Correspondence with the Turkish government on the subject of the - -	14	81	1
Hungary during the recent war between that country and Austria. Correspondence with the agent employed to visit - - - - - - -	10	43	1
Hughes's description of the march of a division of the United States army, under the command of General Wool, from San Antonio de Bexar, in Texas, to Saltillo, in Mexico. Captain - - -	10	32	5
I.			
Indians remaining in Florida. Instructions of 17th September, 1849, of the Secretaries of War and Interior to Brigadier General Twiggs, and S. Spencer, Indian sub agent, respecting the removal of the Seminole - - - - - - -	2	1	961
Indians and Indian affairs in that State. Report of 7th March, 1849, of R. S. Neighbors to Brigadier General Worth, commanding the troops in Texas, in relation to - - - - - -	2	1	963
Indians and Indian affairs in Texas. Captain Catlett's communication, 12th May, 1849, and report of Commissioner of Indian Affairs, 4th June, 1849, in relation to the - - - - - -	2	1	965
Indians for a portion of their lands in Minnesota. Instructions to the commissioners, 25th August, 1849, appointed to negotiate with the Dacotah or Sioux - - - - - - -	2	1	990
Indian affairs in Oregon. Extract from a report of Governor Lane, 9th April, 1848, in relation to -	2	1	994
Indian affairs in New Mexico. Report, 1st October, 1849, of J. S. Calhoun, Indian agent at Santa Fe, in relation to - - - - - -	2	1	994
Indian agent at Salt Lake, California. Report of John Wilson - - - - - - -	2	1	1002
Indian affairs in Minnesota. Report of Governor Ramsey in relation to - - - - - -	2	1	1005
Indian Affairs. Annual report of the Commissioner of -	2	1	937
Indians. Treaty between the United States and the Navajoe tribe of - - - - - -	1	1	113
Indians. Statement of accounts of disbursements made for the benefit of the - - - - -	10	41	1
Indians of the United States on the frontier of Mexico. Translation of a letter from the Mexican minister to the Secretary of State, in relation to the wild -	10	44	1

	Vol.	No.	Page.
Indians in Florida during the past year, the area now occupied by them, their removal, &c. Correspondence relative to hostilities committed by the Seminole - - - - - - -	13	49	1
Indians, for the year ending 30th September, 1848. Report of the Second Auditor of the Treasury in relation to the disbursement or application of moneys, goods, or effects for the benefit of the - -	5	4	1
Indians, according to the principles established by the treaty of August, 1846. Report of the Second Comptroller and Second Auditor of the Treasury, with a statement of the claims of the Cherokee nation of - - - - - - -	6	6	1
Interior, of the condition and operations of the Interior Department during the year 1849. Report of the Secretary of the - - - - -	2	1	1
Interior, with a statement from the Commissioner of the General Land Office, showing the amount of public land originally contained in each State, the number of acres granted to each State for objects of internal improvement, the number necessary to make the grants to each State equal to the maximum of the State receiving the greatest quantity, and the number necessary to make each grant equal in proportion to the areas of each of the several States. Report of the Secretary of the -	6	17	1
Interior, of rejected applications for pensions. Report of the Secretary of the - - - -	6	22	1
Interior, relative to the printing for that department. Report of the Secretary of the - -	10	33	1
Interior, communicating information in relation to the operations of the commission appointed to run and mark the boundary between the United States and Mexico. Reports (parts 1 and 2) of the Secretary of the - - - - - -	10	34	1
Interior, in relation to the public lands in the Milwaukie land district. Report of the Secretary of the -	10	45	1
Interior, in relation to the expense of the judiciary of the District of Columbia. Report of the Secretary of the - - - - - -	13	54	1
Interior, showing the quantity of land sold, the amount of money received therefor, and the amount of incidental expenses thereon, in the years 1847, '48, and '49. Report of the Secretary of the - -	13	63	1
Interior, relative to the swamp and overflowed lands in Louisiana. Report of the Acting Secretary of the - - - - - -	14	68	1
Interior, relative to the Hot Springs of Arkansas. Report of the Secretary of the - - - -	14	70	1

	Vol.	No.	Page.
Interior to General Twiggs, and S. Spencer, sub-Indian agent, dated 17th September, 1849, respecting the removal of the Seminole Indians remaining in Florida. Instructions of the Secretaries of War and - - - - - - - -	2	1	961
J.			
Judiciary of the District of Columbia. Report of the annual expenses, for the last ten years, of the -	13	54	1
K.			
Kosciusko against Alexandre de Bodisco, the Russian minister. Report in relation to measures taken by the Secretary of State on the memorial of the great grandnephew and attorney of the heirs of General	13	50	1
L.			
Lakes, amount of American tonnage engaged, number of seamen employed thereon, &c. Report of the Topographical Bureau, in relation to the commerce of the - - - - - - -	10	48	1
Lake Michigan into Maskegon lake, Black river, and Grand river. Reports of plans and estimates for improving the entrances from - - -	6	20	1
Lands in the Milwaukie land district. Report of the Commissioner of the General Land Office, in relation to the public - - - - -	10	45	1
Land sold, the amount of money received therefor, and the amount of incidental expenses thereon, in the years 1847, 1848, and 1849. Report of the quantity of - - - - - - -	13	63	1
Lands in Louisiana. Report of the Acting Secretary of the Interior relative to the swamp and overflowed	14	68	1
Lands surrounding the Hot springs in Arkansas. Report of the Secretary of the Interior in relation to the applications of private claimants to the - -	14	70	1
Land Office, of the operations of that office during the year 1849. Report of the Commissioner of the General - - - - - - -	2	1	17
Lands sold; of cash, Treasurer's receipts, treasury notes, stock, &c., received therefor; of incidental expenses thereon; and of payments into the treasury on account thereof, in the year 1848. Statement of the public - - - - - -	2	1	36
Lands sold; of cash, Treasurer's receipts, treasury notes, stock, &c., received therefor; of incidental expenses thereon; and of payments into the treasury on account thereof, during the first and second quarters of the year 1849. Statement of public -	2	1	41

	Vol.	No.	Page.
Lands sold; of cash, Treasurer's receipts, treasury notes, stock, &c., received therefor; of incidental expenses thereon; and of payments into the treasury on account thereof, in the third quarter of the year 1849. Statement of public - - - -	2	1	47
Lands in the States of Alabama, Mississippi, Louisiana, and Arkansas; the number of acres covered by such relinquishment, &c., so far as the returns to September 30, 1849, have been received at the General Land Office. Statement showing the number of Choctaw certificates relinquished to the United States for - - - - -	2	1	53
Lands under the act of September 4, 1841, "to appropriate the proceeds of the sales of the public lands, and to grant pre-emption rights." Exhibit of State selections of - - - - - -	2	1	57
Land warrants returned, located for patents, during 1847, 1848, and 1st, 2d, and 3d quarters of 1839. Statement of military bounty - - - - -	2	1	56
Land (exclusive of the 16th or school sections and postponed sales) advertised for sale in 1849; the quantities, the plats of surveys of which have been returned to the General Land Office; the quantities prepared for market not yet advertised; and the probable quantities which will be prepared in 1850. Exhibit of the quantities of public - -	2	1	58
Lands advertised for sale since November 30, 1848, showing the quantity under proclamation, exclusive of school lands. Synopsis of the public	2	1	59
Land States and Territories, the amount of land disposed of by sale and otherwise, and the amount unsold and undisposed of on the 30th September, 1849. Statement of the areas of the several - -	2	1	63
Land claims made by the Commissioner of the General Land Office, and approved by the Secretary of the Treasury or Interior and Attorney General, under the act of 1846, "providing for the adjustment of all suspended pre-emption land claims in the several States and Territories," and the act of 1848, to extend the said act. Abstract of adjudications of - - - - - -	2	1	68
Lands surveyed, &c., in Iowa and Wisconsin, in 1849. Annual report of the surveyor general of Iowa and Wisconsin of the - - - - -	2	1	232
Lands in Michigan. Report of C. T. Jackson, United States geologist, and assistants, of a survey of mineral - - - - - - -	3	1	371
Lands, with reference to mines and minerals in the northern peninsula of Michigan, in the years 1845 and 1846. Report of linear surveys, by Messrs. Burt, Hubbard, Houghton, Higgins, and Ives, of	3	1	803

	Vol.	No.	Page.
Lands originally contained in each State; the number of acres granted to each State for objects of internal improvement; the number necessary to make the grants to each State equal to the maximum of the State receiving the greatest quantity, and the number necessary to make each grant equal in proportion to the areas of each of the several States. Report of the Commissioner of the General Land Office, showing the amount of - - -	6	17	1
Liberia. Report of the Rev. R. R. Gurley, who was recently sent out by the government to obtain information in respect to - - - - - -	14	75	1
Light-houses. Construction, condition, repairs, &c., of	1	1	296
Light houses for the year ending 30th June, 1851. Estimates for - - - - - -	1	1	300
Long's plan and estimate for the repair of the Cumberland dam. Lieutenant Colonel - - -	6	14	1

M.

Mail routes, mail contractors, route agents, local agents, and mail messengers in the several sections on the 30th of June, 1849. Statement of the number of	1	1	802
Mail service in the years 1848 and 1849. Comparative statements of - - - - -	1	1	775
Mail service for the year ending 30th of June, 1849. Tabular statement of - - - -	1	1	800
Mails between Great Britain and the United States. Regulations adopted in relation to the exchange of -	1	1	803
Mail service as in operation October 1, 1849. Statement of steamboat - - - - -	1	1	842
Mail service as in operation October 1, 1849. Statement of railroad - - - - - -	1	1	844
Mail between New York and New Orleans in the year 1849. Report of the Postmaster General respecting the alleged failures of the - - -	13	62	1
Mail in steam vessels between New York and Liverpool and Charleston and Havana. Report of the Postmaster General in relation to an alleged non-compliance of contract for carrying the - -	14	77	1
Manufactures for the year 1849. Report of the Commissioner of Patents in relation to arts and - -	7	15	1
(See table of contents of the above, at page 2 of the same.)			
Map of the valley of Mexico. (See *Mexico.*)			
Marcy, of a route from Fort Smith to Santa Fe. Reconnaissance by Captain - - - -	14	64	1
Marine hospital fund for the relief of sick and disabled seamen. Statement of expenditures from the -	10	31	31
Marine corps, and detailed estimates for the paymaster and the quartermaster of the corps. Report of the commandant of the - - - - -	1	1	751

	Vol.	No.	Page.
Mariners." Professor Espy's report of "Rules for -	12	39	1
Maskegon, lake. (See *Lake.*)			
Medicine and Surgery, with estimates for its support during the fiscal year ending June 30, 1851, and a statement of the number and grades of medical officers required for duty during the same period, at home stations and afloat. Report of the Bureau of - - - - - - - -	1	1	743
Messages of the President. (See *President.*)			
Meteorology, &c. Report of the Commissioner of Patents, in relation to agricultural - - - - -	8	15	1
Meteorological observations, by Professor Espy, part 1. Report of - - - - - - -	11	39	1
Meteorological observations, by Professor Espy, part 2. Report of - - - - - - - -	12	39	1
Mexican minister, to Mr. Clayton, Secretary of State, in relation to the wild Indians of the United States on the frontier of Mexico. Translation of a letter from Mr. De La Rosa - - - - - -	10	44	1
Mexico. Operations of the commission to run and mark the boundary between the United States and -	10	34	1
Mexico. Proclamation of the President of the United States, with correspondence, in relation to an armed expedition alleged to be for the invasion of Cuba, or some of the provinces of - - -	1	1	17
Mexico in relation to the character and validity of the Protocol of the conferences previous to the ratification of the treaty at Queretaro, of May 26, 1848. Correspondence with the legation of - -	1	1	69
Mexico, from surveys by Lieutenants Smith and Hardcastle. Report of the Secretary of War, communicating a map of the valley of - - - -	6	11	1
Michigan. Lake. (See *Lake.*)			
Michigan, by C. T. Jackson, United States Geologist, and his assistants. Report of a survey of mineral lands in - - - - - - -	3	1	371
Michigan, in the years 1845 and 1846. Reports, by Messrs. Burt, Hubbard, Houghton, Higgins, and Ives, of linear surveys with reference to mines and minerals in the northern peninsula of -	3	1	803
Military Academy. (See *Academy.*)			
Military bounty-land warrants. (See *Land.*)			
Military roads. (See *Roads.*)			
Militia, their arms, accoutrements, and ammunition. Abstract of the returns of the - - - -	6	25	1
Militia of the several States for the year 1848, under act of 1808. Statement of the apportionment of arms to the - - - - - - - -	1	1	423
Milwaukie land district. (See *Lands.*)			
Mines and minerals in the northern peninsula of Michigan, in 1845 and 1846. Reports of linear surveys with reference to - - - - - -	3	1	802
(See index to the above, at page 803 of same.)			

	Vol.	No.	Page.
Mineral lands. (See *Lands.*)			
Minnesota, by Brevet Captain Pope. Report of an exploration of the Territory of - - - -	10	42	1
Mint, for the year 1849. Report of the director of the -	6	21	1
N.			
Nautical Almanac, provided for under act of 3d March, 1849. Report of Lieutenant C. H. Davis relative to the - - - - - - -	1	1	443
Navajo country. Report of Lieutenant Simpson's expedition into the - - - - - -	14	64	1
Naval officers. Report in relation to allowances to -	13	51	1
Naval officers of the United States to aid in building up the German navy, &c. Correspondence in relation to securing to the Germanic confederation the services of - - - - - -	1	1	118
Naval stations at home and abroad, submitted July 1, 1849. Statement of the value of provisions, clothing, and small stores at - - - -	1	1	711
Naval stations; and also condemned and sold at auction at naval stations at home and abroad during the year ending June 30, 1849. Statement showing the cost of provisions, clothing, and small stores condemned on board the various national vessels at foreign - - - - - -	1	1	713
Navigation and commerce of the United States for the year ending June 30, 1849. Report of the Register of the Treasury of the - - - - -	5	3	1
Navy, of the condition and operations of the Navy Department of the public service during the year 1849. Report of the Secretary of the - -	1	1	425
Navy, of transfers of appropriations for the naval service during the year ending 30th June, 1849. Report of the Secretary of the - - - - -	6	7	1
Navy, showing the annual number of deaths in the United States squadron on the coast of Africa, and the annual cost of that squadron. Report of the Secretary of the - - - - - -	10	40	1
Navy, in relation to allowances to navy officers. Report of the Secretary of the - - - -	13	51	1
Navy, transmitting a copy of the report of Prof. Charles G. Page on electro-magnetic power as a mechanical agent for the purposes of navigation and locomotion. Report of the Secretary of the - -	13	61	1
Navy pensioners. (See *Pensioners.*)			
Navy. List of deaths, resignations, and dismissions in the - - - - - - - -	1	1	448
Navy-yards, July 1, 1848, and of the articles received and expended from June 30, 1848, to June 30, 1849; also of those remaining on hand July 1, 1849, under the direction of the Bureau of Con-			

	Vol.	No.	Page.
struction, Equipment, and Repairs. Statement of the cost or estimated value of stores on hand at the several - - - - - - - -	1	1	468
Navy-yards, for building, repairing, or equipping vessels of the navy, or in receiving or securing stores and materials for those purposes. Statement of the number of days' labor, and its cost, from July 1, 1848, to July 1, 1849, for the respective - -	1	1	469
Navy-yards, from 4th December, 1848, to 14th November, 1849. Abstract of offers to furnish naval supplies at the several - - - - - -	1	1	514
Navy-yards, July 1, 1848, of articles received and expended from June 30, 1848, to June 30, 1849, and of those remaining on hand July 1, 1849, under the direction of the Bureau of Ordnance and Hydrography. Statement of cost or estimated value of stores on hand at the several - - -	1	1	550
Navy-yards, chargeable to the Bureau of Ordnance and Hydrography. Statement of the number of days' labor, and cost thereof, from July 1, 1848, to June 30, 1849, at the respective - - - -	1	1	551
Navy Department, as settled and allowed at the Fourth Auditor's office for the year ending 30th September, 1849. Abstract of contingent expenses of the	1	1	764
Navy Department, in relation to the amount of prize-money paid into the treasury under the act of March 3, 1849. Correspondence of the - -	10	35	1
Navy Department and officers of the navy, and the governor of Mississippi, in relation to the assemblage, &c., of persons on Round island, coast of Mississippi, during the summer of 1849. Correspondence between the - - - - - -	13	55	1
Navy, communicating to Mr. Levy, chairman of the Committee on Naval Affairs, the report of Professor Espy relating to rules for mariners, part 2. Report of the Secretary of the - - - - -	12	39	1
New Mexico in 1849, (part 1.) Report of civil and military operations in - - - - -	1	1	105
New Mexico, (parts 1 and 2.) Report of the Secretary of War in relation to the formation of a State government in - - - - - -	13	60	1
New Mexico. Message from the President of the United States relative to the claim of Texas to jurisdiction over part of - - - - -	14	67	1
New Mexico, together with a digest of the votes for and against it; also a letter to the late President of the United States from Manuel Alvarez. Constitution adopted by the inhabitants of - -	14	74	1
New Mexico, setting forth sundry grievances, and calling upon Congress for their correction. Communication of R. H. Weightman accompanying a memorial of the legislature of - - - - -	14	76	1

	Vol.	No.	Page.
New Mexico and California. Message from the President of the United States communicating information, with extensive correspondence, in relation to -	9	18	1

O.

Ocean steamers. (See *Steam vessels.*)			
Officers of the navy. Report in relation to allowances to	13	51	1
Ordnance. Annual report of the Colonel of - -	1	1	255
Ordnance stores. (See *Navy yards.*)	6	26	51
Ordnance, in relation to the mode of manufacturing percussion caps, small arms, &c., in France, Belgium, Holland, and England. Report of P. V. Hagner, Brevet Major and First Lieutenant of -	1	1	375
Oregon. Correspondence embracing further information in relation to the formation of a State government in California; and also in relation to the condition of civil affairs in - - - - - -	13	52	1
Overflowed lands. (See *Lands.*)			

P.

Page, on electro-magnetic power as a mechanical agent for the purposes of navigation and locomotion. Report of Professor Charles G. - - - -	13	61	1
Patents in relation to arts and manufactures for the year 1849. Annual report of Commissioner of -	7	15	1
Patents in relation to agricultural statistics, American agriculture, agricultural meteorology, breadstuffs, crops, &c. Report of the Commissioner of - -	8	15	1
Paymaster General of the army, for 1849. Annual report of the - - - - - - -	1	1	198
Pensions, showing the operations of that office during the year 1849. Annual report of the Commissioner of - - - - - - -	2	1	1177
Pensioners in the different States under the several pension acts of 1818, 1828, 1832, 1836, 1838, 1843, 1844, February 2, July 21 and 29, 1848. Statement of the number of - - - - - -	2	1	1180
Pensioners added to the rolls of the several States since the last annual report. Statement of the number of - - - - - -	2	1	1182
Pensioners whose deaths have been reported since the last annual return. Statement of the number of -	2	1	1184
Pensioners who have been paid in the first and second quarters of 1849. Statement of the number of -	2	1	1186
Pension agents at the dates of their last returns, on account of invalid, widows' and revolutionary pensions. Statement of balances in the hands of the several - - - - - - - -	2	1	1188
Pensioners complete to November 7, 1849. Alphabetical list of invalid navy - - - - - -	2	1	1193

	Vol.	No.	Page.
Pensions during the year 1849. Report of rejected appropriations for - - - - -	6	22	1
Pensioners complete to November 7, 1849. Alphabetical list of persons restored to the roll of privateer -	2	1	1204
Pensions under the act of August 11, 1848. Alphabetical list of widows who are now drawing - -	2	1	1205
Pensioned under the act of August 11, 1848. Alphabetical list of the orphan children of officers, seamen, and marines who have been - - - - -	2	1	1215
Peruvian indemnity under the convention of March, 1841. Report in relation to the payment of - -	13	58	1
Peruvian guano. Report respecting the commercial privileges of United States citizens in relation to the trade in - - - - - - -	13	59	1
Peruvian guano. Despatch from J. R. Clay, chargé d'affaires at Lima, respecting - - - -	14	80	1
Pope's exploration of the Territory of Minnesota. Report of Captain - - - - - -	10	42	1
Port of Brazos de St. Jago. Report of the Secretary of the Treasury relative to the commerce of the -	14	69	1
Ports of the United States. Correspondence relating to suits instituted in courts of admiralty against foreign vessels entering the - - - -	14	78	1
Postmaster General of the condition and operations of the Post Office Department during the year 1849. Report of the - - - - - - -	1	1	773
Postmaster General in relation to the mail service for the year ending June 30, 1849. Report of the First Assistant - - - - - - -	1	1	791
Postmaster General respecting the failure of the mail between New York and New Orleans in the year 1849 Report of the - - - - -	13	62	1
Postmaster General in relation to an alleged non-compliance of contract concerning steam vessels carrying the United States mail. Report of the - -	14	77	1
Postmasters by the Postmaster General, which, by law, only belong to the President. Report in relation to the appointment of - - - -	10	37	1
Post Office Departments of Great Britain and the United States in relation to the exchange of mails. Regulations agreed upon between the - - -	1	1	803
President of the United States, with the accompanying documents, in three parts, on the state of the Union. Message from the - - - - - -	1	1	1
President of the United States, communicating copies of a correspondence with the lady of Sir John Franklin relative to the expedition to the Arctic regions under the command of her husband. Message from the - - - - - -	6	8	1
President of the United States, communicating information in relation to the abduction of Rey, alias Garcia, from New Orleans. Message from the -	6	13	1

	Vol.	No.	Page.
President of the United States, communicating information in relation to California and New Mexico. Message from the - - - - - -	9	18	1
President of the United States, communicating the report of the director of the mint for the year 1849. Message from the - - - - - -	6	21	1
President of the United States, with copies of the correspondence in relation to the boundary of Texas. Message from the - - - - - -	6	24	1
President of the United States, communicating a copy of the constitution of California. Message from the	6	28	1
President of the United States, showing the amount of prize money paid into the treasury under the 8th section of the act of March 3, 1849. Message from the - - - - - - -	10	35	1
President of the United States, communicating copies of the correspondence with the British minister relative to the trade in British vessels between the Atlantic and Pacific ports of the United States, and the granting of American registers to British-built vessels purchased by citizens of the United States; also to an increase of duty on British produce or manufactures. Message from the - -	10	36	1
President of the United States, in relation to the appointment of postmasters. Message from the - -	10	37	1
President of the United States, communicating a translation of a note from the Mexican minister in relation to the wild Indians of the United States on the frontier of Mexico. Message from the -	10	44	1
President of the United States, transmiting a memorial of Count de Bronno Bronski, in relation to an improved breed of silk-worms, which he desires to have introduced into the United States. Message from the - - - - - - -	13	53	1
President of the United States, communicating information in relation to military orders issued to the United States officers at Santa Fe, and correspondence between those officers and the War Department in relation to the claims of Texas to jurisdiction over that country. Message from the -	13	56	1
President of the United States, relative to the payment of the Peruvian indemnity. Message from the -	13	58	1
President of the United States, in answer to a resolution calling for information in relation to the formation of a State government in New Mexico, (parts 1 and 2.) Message from the - - -	13	60	1
President of the United States, communicating the report of Lieutenant Webster of a survey of the gulf coast at the mouth of the Rio Grande. Message from the - - - - - - -	14	65	1

	Vol.	No.	Page.
President of the United States, relative to the searching of American vessels by British ships of war. Message from the	14	66	1
President of the United States, relative to the claim of Texas to jurisdiction over part of New Mexico. Message from the	14	67	1
President of the United States, relative to the commerce of the port of Brazos de St. Iago. Message from the	14	69	1
President of the United States, communicating the report of the commissioner to China, made in pursuance of the provisions of the act to carry into effect certain provisions of the treaties between the United States and China and the Ottoman Porte. Message from the	14	72	1
President of the United States, transmitting a copy of the constitution adopted by the inhabitants of New Mexico, together with a digest of the votes for and against it; also a letter to the late President of the United States. Message from the	14	74	1
President of the United States, communicating a copy of the correspondence between the Department of State and the Turkish government, on the subject of the Hungarian exiles. Message from the	14	81	1
President of the United States, communicating further information in relation to the formation of a State government in California, and also in relation to the condition of civil affairs in Oregon. Message from the	13	52	1
President of the United States, communicating information relative to hostilities committed by the Seminole Indians in Florida during the past year, their removal, &c. Message from the	13	49	1
President of the United States, in relation to alleged revolutionary movements in Cuba. Message from the	13	57	1
President of the United States, communicating copies of correspondence with the agent employed to visit Hungary during the recent war between that country and Austria. Message from the	10	43	1
President of the United States, with correspondence in relation to the assemblage, dispersion, &c., of persons on Round island, coast of Mississippi. Message from the	13	55	1
Printing for the Interior Department. Report in relation to the	10	33	1
Privateer pensions. (See *Pensions.*)			
Prize money paid into the treasury under the 8th section of the act of March 3, 1849. Statement of the amount of	10	35	1

	Vol.	No.	Page.
Proclamation of the President of the United States, in relation to an armed expedition for the invasion of Cuba, or some of the provinces of Mexico -	1	1	17
Proposals. (See *Contracts.*)			

Q.

Quartermaster General of the army for the year 1849. Annual report of the - - - - -	1	1	192
	6	26	3

R.

Railroad mail service. (See *Mail Service.*)			
Reconnaissances of Lieutenant Colonel Johnson, and Lieutenants Smith, Bryan, and Michlor, of routes from San Antonio to El Paso; of the western frontier of Texas; from Fort Smith to Santa Fe; and of an expedition to the Navajo country. Reports of	14	64	1
Register of the Treasury, of the commerce and navigation of the States for the year ending 30th June, 1849. Report of the - - - - -	5	3	1
Resignations. (See *Navy.*)			
Revenue since the passage of the act of 1846. Statement of the measures adopted to prevent frauds upon the - - - - - - -	14	79	1
Revenue in California, &c. Report of the Secretary of the Treasury, in relation to the security and collection of the - - - - - -	14	82	1
Rey, alias Garcia, from New Orleans, by the Spanish consul at that port. Correspondence in relation to the abduction of - - - - -	6	13	1
(See list of correspondence at page 2 of the above.)			
Rio Grande. Report of the operations of the army on the	14	73	1
Rivers and harbors for the year ending June 30, 1851. Estimates for the improvement of - -	1	1	300
River. Survey, by Lieutenant Smith, of the Savannah	6	19	1
River, and Grand river. Report of topographical engineers, with plans and estimates for improving the entrance from Lake Michigan into Maskegon lake, Black - - - - - - -	6	20	1
Roads, from the valley of the Mississippi to the Pacific ocean. Report in relation to surveys of routes for military - - - - - - -	1	1	154
Road from Fort Smith, Arkansas, to Santa Fe, in New Mexico. Report and map by Lieutenant Simpson of a - - - - - - -	6	12	1
Round island, on the coast of Mississippi, in the summer of 1849. Correspondence in relation to the assemblage, &c., of persons on - - -	13	55	1
Russian minister. (See *Bodisco.*)			

S.

	Vol.	No.	Page.
Saltillo. (See *San Antonio de Bexar.*)			
San Antonio de Bexar, in Texas, to Saltillo, in Mexico. Memoir of Captain Hughes, in relation to the march of the division of the United States army under the command of General Wool, from -	10	32	5
San Antonio to El Paso, and of the western frontier of Texas, and from Fort Smith to Santa Fe, and of an expedition into the Navajo country. Reconnaissances by Brevet Lieutenant Colonel Johnson and others, of routes from - - -	14	64	1
Santa Fe, New Mexico, made by Lieutenant Simpson. Report and map of the route from Fort Smith, Arkansas, to - - - - - - -	6	12	1
Santa Fe, and correspondence in relation to the claims of Texas over that country. Report in relation to military orders issued to the United States officers at	13	56	1
Santa Fe. Report of Captain Marcy's reconnaissance of the route from Fort Smith to - - -	14	64	1
Savannah river. (See *River.*)			
Scott, on the state and condition of the army in 1849. Report of Major General - - - - -	1	1	99
Seamen. Statement of expenditures from the marine hospital fund for the relief of sick and disabled -	10	31	31
Seamen employed on the lakes. Report of the Bureau of Topographical Engineers, in relation to the commerce, tonnage, and number of - - -	10	48	1
Searching of American vessels by British ships of war. Correspondence relative to the - - -	14	66	1
Second Auditor of the Treasury. (See *Auditor.*)			
Seminole Indians. (See *Indians.*)			
Ships of war. (See *British ships of war.*)			
Silkworms he desires to have introduced into the United States. Memorial of Count de Bronno Bronski, in relation to an improved variety of - -	13	53	1
Simpson, with a map, of the route from Fort Smith, Arkansas, to Santa Fe, New Mexico. Report of Lieutenant - - - - - -	6	12	1
Slaves deported in violation of the treaty of September 3, 1793. Report in relation to claims of American citizens against the British government for -	10	46	1
Smith's survey and examination of the Savannah river. Lieutenant - - - - -	6	19	1
Smith and Hardcastle. Report of the Secretary of War, communicating a map of the valley of Mexico from surveys by Lieutenants - - - -	6	11	1
Spanish consul at the port of New Orleans. Correspondence in relation to the abduction of Rey, *alias* Garcia, by the - - - - - -	6	13	1

(*See list of papers embraced in the above, at page 2 of the same.*)

	Vol.	No.	Page.
Squadron on the coast of Africa. and the annual cost of that squadron. Report of the number of deaths in the United States - - - - -	10	40	1
Squadrons on foreign stations during the fiscal year ending 30th June, 1849. Statement showing the value, &c., of shipments made by the Bureau of Provisions and Clothing to the respective -	1	1	712
State and the minister of the German Empire, in relation to the construction of a war steamer at New York, alleged to be destined for the German service. Correspondence between the Department of -	1	1	18
State and the minister of Mexico, in relation to the protocol of the conferences held previous to the treaty of peace at Queretaro, between the United States and Mexico. Correspondence between the Secretary of - - - - - - -	1	1	69
State, with the correspondence in relation to the resentment of the indignity offered by the British chargé d'affaires for Chili, to the lady of the United States consul at Valparaiso. Report of the Secretary of - - - - - - -	6	16	1
State, showing the names and compensation of the clerks and other persons employed in that department during the year 1849. Report of the Secretary of	10	29	1
State, showing the disbursements of the appropriations for the service of that department, including foreign missions. Report of the Secretary of - -	10	30	1
State, relative to the claims of American citizens against the British government for slaves deported in violation of the treaty of September 3, 1783. Report of the Secretary of - - - - -	10	46	1
State, in relation to the measures taken by him upon the memorial of Ladislaus Wankowicz, great grandnephew of General Kosciusko, and Gaspard Fochman, attorney of the heirs of General Koscuisko, against Alexandre de Bodisco, the Russian minister. Report of the Secretary of - - -	13	50	1
State, respecting the trade in guano. Report of the Secretary of - - - - - -	13	59	1
State, relative to the boundary line between the British and French possessions in North America, as fixed by the treaty of Utrecht. Extract of a letter from the United States minister at London, to the Secretary of - - - - - -	14	71	1
State, relative to suits instituted in the courts of admiralty in the United States against foreign vessels entering our ports. Report of the Secretary of -	14	78	1
State, enclosing a copy of a despatch received from Mr. J. R. Clay, chargé d'affaires at Lima, respecting Peruvian guano. Report of the Secretary of -	14	80	1

	Vol.	No.	Page.
State, communicating further information in relation to the formation of a State government in California; and also in relation to the condition of civil affairs in Oregon. Report of the Secretary of - -	13	52	1
State Department during the year 1849. Statement of the names and compensation of clerks and others employed in the - - - - - -	10	29	2
State Department, including foreign missions. Statement of disbursements of appropriations for the -	10	30	2
State, communicating the report of the Rev. R. R. Gurley, who was recently sent out by the government to obtain information in respect to Liberia. Report of the Secretary of - - - - -	14	75	1
Steamboat mail service. (See *Mail service*.)			
Steam-vessels. Report in relation to an alleged non-compliance of contract to carry the United States mail on the routes between New York and Liverpool, and Charleston and Havana, &c., in - -	14	77	1
Steamer. Report of the Chief of the Bureau of Construction, &c., relative to contracts with Mr. R. L Stevens, for the construction of a war shot and shell-proof - - - - - -	1	1	446
Stores. (See *Navy-yards*.)			
Storms. Report of Professor Espy in relation to -	11	39	1
Suits instituted in courts of admiralty against foreign vessels entering ports of the United States. Report in relation to - - - - - -	14	78	1
Superintendent of the coast survey for the year ending November, 1849. Report of the - - -	5	5	1
Surgeon General of the army for 1849. Annual report of the - - - - - - -	1	1	206
	6	26	41
Surveys of routes for military roads from the valley of the Mississippi to the Pacific ocean. Report of -	1	1	154
Survey of the gulf coast, at the mouth of the Rio Grande. Report of Lieut. Webster of a - - - -	14	65	1
Survey of the Savannah river. Lieutenant Smith's report of a - - - - - -	6	19	1
Surveys of lakes, harbors, &c., by the corps of topographical engineers, in 1849. Report relating to	1	1	294
Surveyor general of Iowa and Wisconsin. Annual report of the - - - - - -	2	1	232
Surveyor general of Illinois and Missouri. Annual report of the - - - - - -	2	1	251
Surveyor general of Ohio, Indiana and Michigan. Annual report of the - - - - -	2	1	282
Surveyor general of Arkansas. Annual report of the -	2	1	313
Surveyor general of Louisiana. Annual report of the -	2	1	328
Surveyor general of Florida. Annual report of the -	2	1	361
Survey of the mineral lands in Michigan, by Charles T. Jackson, United States geologist for said State. Report of a - - - - - -	3	1	371

	Vol.	No.	Page.
Surveys of lands with reference to mines and minerals in the northern peninsula of Michigan. Reports of linear (*See index to same, at page* 803.)	3	1	811
Swamp lands. (See *Lands.*)			

T.

Texas, in 1849. Report of military operations in -	1	1	138
Texas boundary. Correspondence in relation to the -	6	24	1
Texas to the jurisdiction over that country. Correspondence in relation to military orders issued to the United States officers at Santa Fe, and between those officers and the War Department, in relation to the claims of - - - - -	13	56	1
Texas to jurisdiction over part of New Mexico. Message of the President of the United States relative to the claim of - - - - - -	14	67	1
Texas and the adjacent Mexican States on the Rio Grande, accompanied by astronomical observations and descriptive and military memoirs of the country. Report and map by Captain Hughes of the march of the United States army, under General Wool, from San Antonio de Bexar to - - - -	10	32	5
Texas. Report of Lieutenant Whiting's reconnaissances of the western frontier of - - - - -	14	64	1
Tochman. (See *Kosciusko.*)			
Tonnage engaged, &c. Report of the Topographical Bureau in relation to the commerce of the lakes, number of seamen employed, and the amount of American - - - - - - -	10	48	1
Topographical Bureau, with a copy of P. T. Tyson's report upon the geology of California. Report of the	10	47	1
Topographical Bureau of engineers in relation to the commerce of the lakes, American tonnage engaged, and the number of seamen employed thereon, &c. Report of the - - - - - -	10	48	1
Topographical engineers, with estimates for 1849. Annual report of the Colonel of the corps of -	1	1	294
Topographical engineers, &c., with a map descriptive of the march of General Wool's division of the army from San Antonio de Bexar, in Texas, to Saltillo, in Mexico. Memoir of Captain Hughes, of the -	10	32	5
Transfers. (See *Appropriations.*)			
Treasury on the state of the finances. Report of the Secretary of the - - - - - -		2	1
Treasury, transmitting a report from the Register of the Treasury of the commerce and navigation of the United States for the year ending June 30, 1849. Report of the Secretary of the - - -		3	1
Treasury, of the disbursement or application of moneys, &c., for the benefit of the Indians, for the year ending September 30, 1848. Report of the Second Auditor of the - - - - - -		4	1

	Vol.	No.	Page.
Treasury, communicating the report of the superintendent of the coast survey, showing the progress of that work during the year ending November, 1849. Report of the Secretary of the - - -		5	1
Treasury, with a statement of the claims of the Cherokee nation of Indians, according to the principles established by the treaty of August, 1846. Report of the Second Auditor and Second Comptroller of the - - - - - - -		6	1
Treasury, with statements of contracts authorized by that department, of payments for the discharge of miscellaneous claims, and of expenditures from the marine hospital fund for the relief of sick and disabled seamen. Report of the Secretary of the -		31	1
Treasury, with copies of the accounts of disbursements for the benefit of the Indians. Report of the Second Auditor of the - - - - -		41	1
Treasury in relation to the measures adopted to prevent frauds upon the revenue since the passage of the act of 1846. Report of the Secretary of the -		79	1
Treasury in relation to the security and collection of the revenue in California, &c., accompanied by a report from Gilbert Rodman, esq., special agent. Report of the Secretary of the - - -		82	1
Treasury relative to the commerce of the port of Brazos de St. Jago. Report of the Secretary of the -		69	1
Turkish government on the subject of the Hungarian exiles. Correspondence with the - -	14	81	1

U.

United States mail. (See *Mail.*)

V.

Valparaiso. Correspondence in relation to the resentment of an indignity offered at Lima, by the British chargé d'affaires, to the lady of the American consul at - - - - - - - -	6	16	1
Vessels by British ships-of-war. Correspondence in relation to the searching of American - -	14	66	1
Vessels entering the ports of the United States. Report of Secretary of State, with correspondence relating to foreign - - - - - -	14	78	1
Vessels in commission November 1, 1849. Statement of -	1	1	464
Vessels in ordinary November 1, 1849 Statement of -	1	1	466
Vessels on the stocks and in progress of construction, November 1, 1849. Statement of - -	1	1	467
Vessels broken up, sold, or lost, since the last annual report. Statement of - - - - -	1	1	468

	Vol.	No.	Page.
W.			
Wankowicz. (See *Kosciusko.*)			
War steamer. (See *Steamer.*)			
War, accompanying the President's annual message, of the operations of the War Department during the year 1849. Report of the Secretary of - -	1	1	90
War, with statements of expenditures of the various offices and bureaus of that department during the fiscal year ending 30th June, 1849. Report of the Secretary of - - - - -	6	9	1
War, with a statement showing the appropriations and expenditures for the service of that department during the fiscal year ending 30th June, 1849. Report of the Secretary of - - -	6	10	1
War, communicating a map of the valley of Mexico, from surveys by Lieutenants Smith and Hardcastle. Report of the Secretary of - - -	6	11	1
War, communicating the report and map of the route from Fort Smith, Arkansas, to Santa Fe, New Mexico, made by Lieutenant Simpson. Report of the Secretary of - - - - -	6	12	1
War, with Lieutenant Colonel Long's plan and estimate for the repair of the Cumberland dam. Report of the Secretary of - - - - -	6	14	1
War, communicating a copy of Lieutenant Smith's survey and examination of the Savannah river. Report of the Secretary of - - - - -	6	19	1
War, communicating copies of reports, plans, and estimates for improving the entrances from Lake Michigan into Maskegon lake, Black river, and Grand river. Report of the Secretary of - -	6	20	1
War, showing the names of all persons employed in the several branches of the War Department, other than army officers, during the year 1849. Report of the Secretary of - - - -	6	23	1
War, with an abstract of the returns of the militia, their arms, accoutrements, and ammunition. Report of the Secretary of - - - -	6	25	1
War, with a statement of the expenses of the national armories, and the number of arms and appendages made and repaired, during the year ending 30th June, 1849. Report of the Secretary of - -	6	27	1
War, communicating the report of an exploration of the Territory of Minnesota, by Brevet Captain Pope. Report of the Secretary of - - -	10	42	1
War, communicating a report of the Topographical Bureau, in relation to the commerce of the lakes, the amount of American tonnage engaged, and the number of seamen employed thereon. Report of the Secretary of - - - - -	10	48	1

	Vol.	No.	Page.
War, communicating reports of Generals Smith and Riley, Lieutenants Talbot and Ord, Mr. Tyson, and Professor Frazer, in relation to the geology, mineralogy, and topography of California and Oregon. Report of the Secretary of - -	10	47	1
War Department in relation to surveys of routes for roads from the valley of the Mississippi to the Pacific ocean, (part 1.) Report and correspondence of the	1	1	155
War Department, in relation to military operations in California. Report and correspondence of the -	1	1	156
War, showing the contracts made under the War Department, during the year ending June 30, 1849. Report of the Secretary of - - - - -	6	26	1
War, communicating a map showing the operations of the army of the United States in Texas and the adjacent Mexican states on the Rio Grande, accompanied by astronomical observations, and descriptive and military memoirs of the country. Report of the Secretary of - - -	10	32	1
War, with reconnaissances of routes from San Antonio to El Paso, by Brevet Lieutenant Colonel J. E. Johnston, Lieutenants Smith, Bryan, and Michler, and Captain S. G. French, of the quartermaster's department. Report of the Secretary of -	14	64	1
War, in relation to the operations of the army on the Rio Grande. Report of the Secretary of - -	14	73	1
War and Interior to General Twiggs, and S. Spencer, sub-agent, respecting the removal of the Seminole Indians remaining in Florida, dated 17th September, 1849. Instructions of the Secretaries of -	2	1	961
War, communicating the reconnaissance of Lieutenant Simpson and others. Report of the Secretary of -	14	64	1
Webster, of a survey of the gulf coast at the mouth of the Rio Grande. Report of Lieutenant - -	14	65	1
Weightman, accompanying a memorial of the legislature of New Mexico, setting forth sundry grievances, and praying their redress. Communication of R. H. - - - - - - -	14	76	1

West Point. (See *Academy.)*
Widow pensioners. (See *Pensions.)*

Y.

Yards and Docks. (See *Bureau of Yards and Docks.)*

TABLE

OF

EXECUTIVE DOCUMENTS,

PRINTED

BY ORDER OF THE SENATE OF THE UNITED STATES,

DURING THE

FIRST SESSION THIRTY-FIRST CONGRESS,

1849–'50.

CONTAINED IN FOURTEEN VOLUMES.

MESSAGES FROM THE PRESIDENT OF THE UNITED STATES, VIZ:

	Vol.	No.	Page.
On the state of the Union, with the accompanying reports and documents	1	1	1
Accompanying documents, viz:			
Proclamation relating to an armed expedition for the invasion of Cuba	1	1	17
Correspondence between the Secretary of State and the Minister of the German Empire	1	1	18
Correspondence between the Secretary of State and the Minister of Mexico	1	1	69
Annual report of the Secretary of War	1	1	90
Documents accompanying report of Secretary of War, viz:			
Letter from Major General Scott	1	1	98
Reports of operations in New Mexico	1	1	104
Reports of operations in Florida	1	1	116
Reports of operations in Texas	1	1	138
Instructions relative to surveys west of the Mississippi	1	1	154
Instructions and reports relative to affairs in California	1	1	156
Report of the Adjutant General	1	1	179
Report of the Quartermaster General	1	1	192
Report of the Paymaster General	1	1	198
Report of the Commissary General	1	1	204
Report of the Surgeon General	1	1	206
Report of the Chief Engineer	1	1	212
Report of the Colonel of the Corps of Topographical Engineers	1	1	294

	Vol.	No.	Page.
Report of the Colonel of Ordnance	1	1	355
Annual report of the Secretary of the Navy	1	1	425
Documents accompanying report of Secretary of the Navy, viz:			
Report of Lieutenant Davis relative to the Nautical Almanac	1	1	443
Report of Professor Page relative to the capacity and usefulness of the electro-magnetic power as a mechanical agent	1	1	445
Report of the Chief of the Bureau of Construction, &c., relative to contracts with Mr. R. L. Stevens for the construction of a shot and shell-proof steamer	1	1	446
List of deaths, resignations, and dismissions in the navy	1	1	448
Aggregate of estimates	1	1	454
General estimate for the office of the Secretary of the Navy and the several bureaus of the Navy Department	1	1	455
Estimate of the sums required for the expenses of the southwest executive building	1	1	455
General estimate for the naval service	1	1	456
General estimate for the marine corps	1	1	457
Detailed estimates from the Navy Department	1	1	458
Report and detailed estimates from the Bureau of Construction, Equipment, and Repair	1	1	460
Report and detailed estimates from the Bureau of Ordnance and Hydrography	1	1	548
Report and detailed estimates from the Bureau of Navy Yards and Docks	1	1	554
Report and detailed estimates from the Bureau of Provision and Clothing	1	1	706
Report and detailed estimates from the Bureau of Medicine and Surgery	1	1	743
Report of the commandant of the marine corps, and detailed estimates from the paymaster and quartermaster of the corps	1	1	751
Statement of the expenditures under the head of contingent expenses, as settled and allowed at the office of the Fourth Auditor of the Treasury Department	1	1	761
Statement of the appropriations for the naval service, viz: balances on hand on the 1st July, 1848; appropriations for the fiscal year 1848–'49; amounts drawn from the treasury during that fiscal year, and the balances on hand on the 30th June, 1849	1	1	764
Annual report of the Postmaster General	1	1	773
Documents accompanying report of Postmaster General, viz:			
Report of the Auditor of the Post Office Department	1	1	787
Report of the First Assistant Postmaster General	1	1	791
Report of the Census Board	1	1	851
Annual report of the Secretary of the Interior	2	1	1

Documents accompanying report of Secretary of the Interior, viz:	Vol.	No.	Page.
Report of the Commissioner of the General Land Office	2	1	17
Statement of public lands sold; cash, &c., received; incidental expenses thereon, and payments on account thereof, in the years 1848, and 1st, 2d, and 3d quarters of 1849	2	1	36 41 47
Statement of Choctaw certificates relinquished for public lands to 30th September, 1849	2	1	53
Statement of military bounty land warrants returned located for patents during 1847, 1848, and the 1st, 2d, and 3d quarters of 1849	2	1	56
Exhibit of State selections of land under act of 4th September, 1841	2	1	57
Exhibit of the quantity of public lands advertised for sale in 1849, the quantity for which the plats of survey have been returned to the General Land Office, &c.	2	1	58
Synopsis of public lands advertised for sale since 30th November, 1848, and showing the quantity under proclamation exclusive of school lands	2	1	59
Statement of the areas of the several States and Territories, the amount of land disposed of by sale, &c., and the amount undisposed of on the 30th September, 1849	2	1	63
Estimate of appropriations required for the office of the Commissioner of the General Land Office for the fiscal year ending 30th June, 1851	2	1	65
Estimate of appropriations for the surveying department for the fiscal year ending 30th June, 1851	2	1	66
Abstract of entries adjusted and confirmed under act of August 3, 1846	2	1	68
Annual reports of surveyors general and accompanying documents	2	1	232
Annual report of the Commissioner of Indian Affairs (*See schedule of accompanying papers at page* 959.)	2	1	937
Annual report of the Commissioner of Pensions, showing the operations of the Pension Office during the year 1849	2	1	1177
Communicating copies of correspondence with the lady of Sir John Franklin relative to the naval expedition to the Arctic regions under the command of her husband	6	8	1
Communicating information in relation to the abduction, by the Spanish consul, of Rey, alias Garcia, from New Orleans	13	13	1
Communicating information in relation to California and New Mexico	9	18	1
Communicating the report of the director of the mint for the year 1849	6	21	1
Communicating copies of correspondence in relation to the boundary of Texas	6	24	1

	Vol.	No.	Page.
Communicating a copy of the constitution of California	6	28	1
Showing the amount of prize money paid into the treasury under the 8th section of the act of March 3, 1849	10	35	1
Communicating copies of the correspondence with the British minister relative to the trade in British vessels between the Atlantic and Pacific ports of the United States, and the granting of American registers to British-built vessels purchased by citizens of the United States; also to an increase of duty on British produce or manufactures	10	36	1
In relation to the appointment of postmasters by the Postmaster General, which belong only to the President	10	37	1
Communicating copies of correspondence with the agent employed to visit Hungary during the recent war between that country and Austria	10	43	1
Communicating the translation of a note from the Mexican minister in relation to the wild Indians of the United States on the frontier of Mexico	10	44	1
Communicating information relative to hostilities committed by the Seminole Indians in Florida during the past year, their removal, &c.	13	49	1
Transmitting a memorial of Count de Bronno Bronski, in relation to an improved breed of silk-worms, which he desires to have introduced into the United States	13	53	1
Communicating further information in relation to the formation of a State government in California, and also in relation to the condition of civil affairs in Oregon	13	52	1
Communicating correspondence in relation to the assemblage, dispersion, &c., of persons on Round island, coast of Mississippi	13	55	1
In relation to alleged revolutionary movements in the island of Cuba	13	57	1
In relation to military orders issued to the United States officers at Santa Fe, and correspondence between those officers and the War Department in relation to the claims of Texas to jurisdiction over that country	13	56	1
In relation to the payment of the Peruvian indemnity	13	58	1
In answer to a resolution calling for information in relation to the formation of a State government in New Mexico, (parts 1 and 2)	13	60	1
Communicating the report of Lieutenant Webster of a survey of the gulf coast at the mouth of the Rio Grande	14	65	1
In relation to the searching of American vessels by British ships of war	14	66	1
In relation the claim of Texas to jurisdiction over part of New Mexico	14	67	1

	Vol.	No.	Page.
In relation to the commerce of the port of Brazos de St. Iago	14	69	1
Communicating the report of the Commissioner to China, made in pursuance of the act to carry into effect certain provisions of the treaties between the United States and China, and the Ottoman Porte	14	72	1
Transmitting a copy of the constitution adopted by the inhabitants of New Mexico, with a digest of the votes for and against it; also a letter from the members of the convention to the late President of the United States	14	74	1
Communicating a copy of the correspondence between the Department of State and the Turkish government on the subject of the Hungarian exiles in Turkey	14	81	1

REPORTS FROM THE SECRETARY OF STATE.

Communicating correspondence between the Department of State and the minister of the German empire, in relation to the construction of a war-steamer at New York, alleged to be destined for the German service	1	1	18
Communicating correspondence between the State Department and the Mexican minister, in relation to the protocol of the conferences held previous to the treaty of peace at Queretaro between the United States and Mexico	1	1	69
With the correspondence in relation to the resentment of the indignity offered by the British chargé d'affaires for Chili to the lady of the United States consul at Valparaiso	6	16	1
Showing the names and compensation of the clerks and other persons employed in the State Department during the year 1849	10	29	1
Showing the disbursements of the appropriations for the service of the State Department, including foreign missions	10	30	1
In relation to the claims of American citizens against the British government for slaves deported in violation of the treaty of 3d September, 1783	10	46	1
In relation to measures taken upon the memorial of Ladislaus Wankowicz, great grand-nephew, and Gaspard Tochman, attorney of the heirs of General Koskiusko, against the Russian minister, Alexandre de Bodisco	13	50	1
In relation to regulations concerning the trade in guano	13	59	1
In relation to the boundary line between the British and French possessions in North America, as fixed by the treaty of Utrecht	14	71	
In relation to suits instituted in the courts of admiralty in the United States against foreign vessels entering the ports of the United States	14	78	1

	Vol.	No.	Page.
Transmitting a copy of a despatch received from Mr. J. R. Clay, chargé d'affaires at Lima, respecting Peruvian guano	14	80	1
Communicating further information in relation to the formation of a State government in California, and also in relation to the condition of civil affairs in Oregon	13	52	1
Communicating a statement of the names and compensation of clerks and others employed in the State Department	10	29	2
Communicating a statement of the disbursements of appropriations for the State Department	10	30	2
Communicating the report of the Rev. R. R. Gurley, government agent to obtain information in respect to Liberia	14	75	1
REPORTS FROM THE SECRETARY OF THE TREASURY.			
On the State of the finances	4	2	1
Transmitting a report of the Register of the Treasury of the commerce and navigation of the United States for the year ending 30th June, 4849	5	3	1
Communicating the report of the superintendent of the coast survey, showing the progress of that work during the year ending November, 1849	5	5	1
Communicating statements of contracts authorized by the Treasury Department, of payments for the discharge of miscellaneous claims, and of expenditures from the marine hospital fund for the relief of sick and disabled seamen	10	31	1
In relation to the measures adopted to prevent frauds upon the revenue since the passage of the act of 1846	14	79	1
In relation to the security and collection of the revenue in California, &c., accompanied by a report from Gilbert Rodman, special agent	14	82	1
In relation to the commerce of the port of Brazos de St. Iago	14	69	1
REPORTS FROM THE SECRETARY OF THE INTERIOR.			
On the condition and operations of the Interior Department during the year 1849	2	1	1
Communicating statements of the Commissioner of the General Land Office, showing the amount of public land originally contained in each State, the number of acres granted to each State for objects of internal improvement, the number necessary to make the grants to each State equal to the maximum of the State receiving the greatest quantity, and the number necessary to make each grant equal in proportion to the areas of each of the several States	6	17	1

	Vol.	No.	Page.
ommunicating a statement of rejected applications for pensions	6	22	1
ı relation to the printing for the Interior Department	10	33	1
ommunicating information in relation to the operations of the commission appointed to run and mark the boundary between the United States and Mexico, in parts 1 and 2	10	34	1
ı relation to the public lands in the Milwaukie land district	10	45	1
ı relation to the expense of the judiciary of the District of Columbia	13	54	1
howing the quantity of land sold, the amount of money received therefor, and the amount of incidental expenses thereon, in the years 1847, 1848, and 1849	13	63	1
ı relation to the swamp and overflowed lands in Louisiana	14	68	1
relation to the lands embracing the Hot Springs of Arkansas	14	70	1

REPORTS FROM THE SECRETARY OF WAR.

the operations of the War Department during the year 1849	1	1	90
relation to surveys of routes for roads from the valley of the Mississippi to the Pacific ocean (part 1)	1	1	155
relation to the military operations in California	1	1	156
owing the contracts made under the War Department during the year ending June 30, 1849	6	26	1
mmunicating a map showing the operations of the army of the United States in Texas and the adjacent Mexican States on the Rio Grande, accompanied by astronomical observations, and descriptive and military memoirs of the country	10	32	1
mmunicating statements of expenditures of the various offices and bureaux of that department during the fiscal year ending 30th June, 1849	6	9	1
mmunicating a statement showing the appropriations and expenditures for the service of the War Department during the fiscal year ending 30th June, 1849	6	10	1
mmunicating a map of the Valley of Mexico, from surveys by Lieutenants Smith and Hardcastle	6	11	1
mmunicating the report and map of the route from Fort Smith, Arkansas, to Santa Fe, New Mexico, made by Lieutenant Simpson	6	12	1
mmunicating Lieutenant Colonel Long's plan and estimate for the repair of the Cumberland dam	6	14	1
mmunicating a copy of Lieutenant Smith's survey and examination of the Savannah river	6	19	1
nmunicating copies of reports, plans, and estimates for improving the entrances from Lake Michigan into Maskegon lake, Black river, and Grand river	6	20	1

	Vol.	No.	Page.
Showing the names of all persons employed in the several branches of the War Department, other than army officers, during the year 1849	6	23	1
Communicating an abstract of the returns of the militia, their arms, accoutrements, and ammunition	6	25	1
Communicating a statement of the expenses of the national armories, and the number of arms and appendages made and repaired, during the year ending 30th June, 1849	6	27	1
Communicating a report of an exploration of the Territory of Minnesota by Brevet Captain Pope	10	42	1
Communicating a report of the Topographical Bureau in relation to the commerce of the lakes, the amount of American tonnage engaged, and the number of seamen employed thereon	10	48	1
Communicating reports of Generals Smith and Riley, Lieutenants Talbot and Ord, Mr. Tyson and Professor Frazer, in relation to the geology, mineralogy, and topography of California and Oregon	10	47	1
Communicating reports of reconnaissances of routes from San Antonio to El Paso by Brevet Lieutenant Colonel Johnston, Lieutenants Smith, Bryan, and Michler, and Captain S. G. French, of the quartermaster's department	14	64	1
Communicating reports of the operations of the army on the Rio Grande	14	73	1
Communicating the reconnaissances of Lieutenant Simpson and others	14	64	1
REPORTS FROM THE SECRETARY OF THE NAVY.			
On the condition and operations of the navy department of the public service during the year 1849	1	1	425
Communicating a statement of transfers of appropriations for the naval service during the year ending 30th June, 1849	6	7	1
Showing the annual number of deaths in the United States squadron on the coast of Africa, and the annual cost of said squadron	10	40	1
In relation to allowances to navy officers	13	51	1
Transmitting a copy of the report of Professor Charles G. Page on electro-magnetic power as a mechanical agent for the purposes of navigation and locomotion	13	61	1
Transmitting a copy of the report of Professor Espy's "rules for mariners"	12	39	1
REPORTS FROM THE POSTMASTER GENERAL.			
On the condition and operations of the Post Office Department during the year 1849	1	1	773
In relation to the mail service for the year ending June 30, 1849	1	1	791

	Vol.	No.	Page.
relation to the appointment of postmasters by him which by law the President is required to make -	10	37	1
relation to the failure of the mail between New York and New Orleans in the year 1849 - -	13	62	1
relation to an alleged non-compliance of contract by proprietors of steam-vessels carrying the United States mail - - - - - -	14	77	1
REPORT FROM THE CENSUS BOARD.			
mmunicating to the Senate the report of their contracts for paper, &c. - - - - - -	10	38	1
PORTS FROM THE COMMISSIONER OF THE GENERAL LAND OFFICE.			
the operations of the General Land Office during the year 1849 - - - - - - -	2	1	17
relation to the public lands in the Milwaukie land district - - - - - - -	10	45	1
relation to claimants of land surrounding the Hot Springs of Arkansas - - - - -	14	70	1
REPORTS FROM THE COMMISSIONER OF PATENTS.			
the condition and operations of the Patent Office for the year 1849; in relation to arts and manufactures	7	15	1
relation to agricultural statistics, American agriculture, agricultural meteorology, breadstuffs, crops, &c. -	8	15	1
EPORT FROM THE COMMISSIONER OF INDIAN AFFAIRS.			
the operations of the Indian Department for 1849 -	2	1	937
REPORT FROM THE COMMISSIONER OF PENSIONS.			
the operations of the Pension Office in 1849 - -	2	1	1177
DOCUMENTS ON VARIOUS SUBJECTS.			
port from the Second Comptroller and Second Auditor of the Treasury, exhibiting a statement of the claims of the Cherokee nation of Indians, according to the principles established by the treaty of August, 1846 - - - - - -	6	6	1
port by Professor Espy of meteorological observations in the year 1849 - - - - - -	11 12	39	1
port of the Second Auditor of the Treasury, with copies of accounts of disbursements for the benefit of the Indians - - - - - -	10	41	1
mmunication of R. H. Weightman, accompanying the memorial of the legislature of New Mexico, setting forth sundry grievances, and calling upon Congress for their correction - - - - -	14	76	1

31st Congress, 1st Session. [SENATE.] Ex. Doc No. 15.

REPORT

OF THE

COMMISSIONER OF PATENTS,

FOR

THE YEAR 1849.

PART I.

ARTS AND MANUFACTURES.

CONTENTS.

I. Finances and Statistics of the Patent Office.
II. Inventions and Claims.
III. Examiners' and Machinist's Reports.
IV. Origin and Progress of Invention.
V. The Motors: Chief Levers of Civilization.
VI. Proposed Applications of the Patent Fund.—1. Publication of Specifications: 2. Preparation of a General, Analytical and Descriptive Index of Inventions: 3. Institution of National Prizes.
VII. Historical Notices of Inventions, from Archives of the States.
VIII. On the Propulsion of Steamers.

WASHINGTON:
OFFICE OF PRINTERS TO THE SENATE.
1850.

TABLE OF CONTENTS.

I.—FINANCIAL AND STATISTICAL.

PAGE.

Patent Fund,..... 6— 14
Modification of Patent Laws,..... 7— 13
Receipts and Expenditures,..... 13
Classified List of Expired Patents,..... 15— 32
Alphabetical List of persons whose Patents expired in 1849,..... 33— 44
Classified List of Patents granted during the year 1849,..... 45— 73
Additional Improvements,..... 74— 75
Designs,..... 76— 77
Alphabetical List of Patentees for the year 1849,..... 78—112
Tables showing the number of Patents granted to citizens of the United States and the District of Columbia for every 10 years from 1790 to January, 1850,.....113—144
———— to Foreigners,.....145—146

II.—INVENTIONS AND CLAIMS

For 1849,.....147—402

III.—EXAMINERS' AND MACHINIST'S REPORTS.

C. G. Page,.....403
W. P. N. Fitzgerald,.....420
H. B. Renwick,.....439
L. D. Gale,.....453
A. B. Stoughton,.....481

IV.—ORIGIN AND PROGRESS OF INVENTION.

Advent of the Arts,.....483
Their early development.....484
What is yet to be done by them,.....485
Discoveries and improvements endless,.....486
Dignity of mechanical pursuits,.....487
Inventors and what they have done,.....489
Errors entertained respecting inventors,.....491
Prospects before inventors are brightening,.....492
Influence of freedom on the progress of arts,.....493

V.—THE MOTORS: CHIEF LEVERS OF CIVILIZATION.

Nonage of the Motors,.....498
Era of animal forces,.....499
Inorganic Motors.....501
Forces artificially excited,.....502
Atmospheric Pressure,.....503
The Ocean,.....504
Explosive Forces,.....505
Gunpowder,.....506
Means of employing Explosives,.....506
Electric Motors,.....507
Atmospheric or common electricity,.....509

VI.—PROPOSED APPLICATIONS OF THE PATENT FUND.

PAGE.
Publication of the Specifications and Drawings,.....513
Publication of a General, Analytical and Descriptive Index of Discoveries and Inventions,..516
Institution of National Premiums for new Discoveries, &c.,.....518
Inventors' Premium Fund,.....520
Premium Medals,.....522
Premiums for what offered,.....523
Increasing the speed of ocean steamers,.....524
Prize for a new Motor,.....524

VII.—HISTORICAL NOTICES OF INVENTORS AND PATENTEES.

John Fitch—description and figure of his Steamboat,.....526
His pamphlet entitled "The Original Steamboat supported," or a reply to the Pamphlet of Rumsey,.....528
Jacob Perkins,.....545

PAPERS AND ABSTRACTS RELATING TO EARLY AMERICAN INVENTIONS FROM THE ARCHIVES OF THE STATES.

Circular addressed to Governors of States,.....548
" " " Senators,.....549
Connecticut,.....550
New York,.....552
Maryland,.....571
New Hampshire,.....577
Vermont,.....586
Louisiana,.....587
Kentucky,.....588
Pennsylvania,.....589
Georgia,.....590
Florida,.....591
Alabama,.....592
Michigan,.....593

VIII.—ON THE PROPULSION OF STEAMERS.

Buoyant or Displacing Paddles,.....603
Thickness of Paddles,.....603
Number of Paddles,.....606
Coating Paddles with materials that repel water,.....609
Additional observations,.....610
Concluding remarks on Propellers,.....625

STEREOTYPED AT THE
BALTIMORE TYPE AND STEREOTYPE FOUNDRY,
FIELDING LUCAS, JR., PROPRIETOR.

REPORT

OF THE

COMMISSIONER OF PATENTS.

PATENT OFFICE, 16th January, 1850.

SIR:—Agreeably to the requisition of the act which makes it the duty of the Commissioner to communicate to Congress the condition of the Patent Office "in the month of January annually," the undersigned respectfully submits PART FIRST of the report for the year just expired. PART SECOND, assigned to Agriculture, cannot be ready for some months. Under no circumstances could it be prepared by the time designated by law for the presentation of matters relating to inventions, since that would involve the collection and arrangement of statistics for the year before the year expired,

I have the honor to be,

Most respectfully,

Your obedient servant,

THOMAS EWBANK.

To Hon. MILLARD FILLMORE,

Vice President of the United States, and President of the Senate.

I.

FINANCIAL, STATISTICAL, &c.

THE whole number of applications for patents received during the year ending December 31st, 1849, is nineteen hundred and fifty-five; the number of caveats filed during the same period is five hundred and ninety-five. The whole number of patents issued during the year 1849, is ten hundred and seventy-six; including thirty re-issues, five additional improvements, and forty-nine designs. No disclaimers have been entered during the year. Within the year 1849, seven hundred and fifty-one patents have expired; a list of which is annexed, marked F. There were eleven applications to extend patents, the terms of which were about to expire; seven of which were granted and four rejected. None have been extended by act of Congress within the year.

The receipts of the Office for the year 1849, on account of applications for patents, caveats, additional improvements, re-issues, extensions, recording assignments, powers of attorney, &c., and for copies, amount to $80,563.17; to which sum has been added $150.00 received of L. B. Shepperd, Esq., (late United States District Attorney, New York,) recovered of Messrs. Brown and Maher for violation of the 5th section of the act of Congress, approved August 29th, 1842; and the sum of $39.61 on sale of old matting and carpeting, making the whole receipts of the Office for the year the sum of $80,752.78, as per statement marked A.

The expenses of the Office for the year 1849 are as follows: For salaries, $29,072.11; contingent expenses, $12,367.70; library, $2,748.41;* temporary clerks, $10,040.01; agricultural statistics, $3,395.76; refunding money paid by mistake, $509.12; analysis of breadstuffs, $1,400;† librarian, $290.00; Chief Justice of District of Columbia, sitting on appeals from Commissioner of Patents, $100; on applications withdrawn, $17,793.33; amounting, in the whole sum, to $77,716.44, as per statement marked B:—leaving a balance to be carried to the credit of the Patent Fund of $3,036.34, as per statement C.

On the first day of January, 1849, the amount of money in the Treasury to the credit of the Patent Fund was $216,468.83. Of this sum, $50,000 was appropriated by Congress by the act approved March 3d, 1849, for the erection of the wings of the Patent Office, which has been drawn out and expended. The net receipts of this Office for 1849, added to the balance remaining, makes the amount in the Treasury to the credit of the Patent Fund on the 1st day of January, 1850, $169,505.17, as per statement D.

At first glance it may be matter of surprise to some that the amount carried to the credit of the Patent Fund for the year ending December 31st, 1849, should be comparatively so small. This apparent deficit is fully explained by the following remarks taken from the report of the late Commissioner for the year 1848:

"The large *balances over expenditures* which have accrued during the last four years were caused in part by the great increase of applications for

* Of the above sum $2,500 were paid for books ordered in previous years.
† Part of this amount is from the appropriation of 1848.

patents which accumulated to such a degree as far to exceed the ability of the examining force of the Office to dispose of them, thus occasioning a disproportion between the applications and withdrawals as compared with former years. That cause has been removed by the recent increase of the force of the Office, and it may now be expected that until the Office is relieved of its accumulated business, the proportion of withdrawals to the receipts of the Office will be greater than in former years, and consequently the *balance which will accrue to the credit of the Patent Fund will be less.*"

As illustrative of the correctness of the above, it may be well here to state, that out of the receipts of this Office for the year 1849, the sum of $11,353. 33 has been paid on withdrawals of applications made previous to that year. The amount refunded on withdrawals upon applications made in 1849, is $6,440. Thus it will be perceived that, had no portion of the receipts of the Office been paid back on withdrawals except upon applications made in 1849, the amount carried to the credit of the Patent Fund from the business of the past year would have been $14,389.67.

The number of cases on examiners' desks January 1st, 1849, was five hundred and thirty-nine; the number of applications received during the year, nineteen hundred and fifty-five, making the whole number of applications before the Office for the year, twenty-four hundred and ninety-four. Of this number, nine cases remained unexamined on the 31st December, 1849. The business of the Office for the past year shows the examination of two thousand four hundred and eighty-five applications, resulting in the issue of ten hundred and seventy-six patents, and fourteen hundred and nine rejections and suspensions, as exhibited per statement E.

The act of March 3d, 1837, constitutes the Chief Justice of the District of Columbia a court of appeal from the decisions of the Commissioner of Patents. The very great increase of Patent business has resulted in rendering the duties of that officer in many cases onerous, and the compensation allowed by law disproportionate to the services rendered. An increase of the amount now paid him, would be no more than an act of justice in view of the duties imposed upon him by law.

With respect to the modification of the patent laws, I beg leave to refer to the able reports of my immediate predecessor, whose views as to the necessity of giving further security to inventors, accord with my own, and to whose forcible language on the subject I can add nothing. It is admitted that all legislation which has in view the security of an exclusive right, is intended to guard the public good against a violation of the faith reposed in its bestowal. That, on the other hand, it is equally the duty of the legislature, if it deems proper to extend to individuals or corporations such right on certain conditions, to protect them in its enjoyment. That such in a greater or less degree is not the case in regard to inventors must be obvious to those who have been conversant with the operation of the patent laws now in force. It is not expected, in view of their modification, that a perfection can be attained which will meet every emergency; but the least which should be done is to apply a remedy whenever an object designed by enactment, is defeated in its operation.

Some years of experience seem to have illustrated the inoperative effect of the law intended to secure the inventor in the enjoyment of his privilege. Were all men equally capable of producing, fewer would be found engaged in plundering inventions which belong to his neighbor. Such, however, not being the case, unfortunately the lack of inventive talent is in many instances

supplied only by the desire for gain, and ingenuity in attaining it, at the sacrifice of the real mechanist.

The public mind, interested in the progress of the arts, as fostered by the establishment of this office, is now turned towards a remedy of the evil; and to the undersigned it seems but justice that the remedy should be applied.

Inadequacy of protection, is what is chiefly complained of — the violation of a right as sacred as any personal possession, without the remedy guaranteed against a petty larceny. It is manifestly unjust that the time and means of the inventor should be expended in defending that which Government accords as peculiarly his own, in every instance where a wilful trespasser is called upon to respond in damages for infringement. He is thus subjected to all the horrors of interminable and ruinous litigation; and, if his assailants are more fortunate in having the means of attack than he of defence, his case is hopeless, and he may be likened, as once were chancery clients, to sheep that, having taken shelter in the hedge, come forth "piteously complaining," leaving their fleece upon the bush.

It may be contended that all other titles to property are justly subject to investigation without limitation; — and that an exception in this instance would be a departure from the well settled principles of practice and law. The argument might be good, were all property equally the result of mental creation and equally susceptible of public invasion. Unlike a chattel, it can be stolen by one, or a thousand, and by all at the same time. Its appropriation by one interposes no obstacle to its larceny by another, and thus the inventor is subject to be plundered by every person who chooses to violate his right. He appeals to the law for redress, and the remedy he adopts proves to be one of self-immolation.

May not, then, the claim of the patentee to his invention present an exception to the general rule governing title—an exception demanded in justice to himself, and without involving any burden to the public? It is intended in its very inception, to subject it to a thorough and rigid examination by competent judges of its originality as well as usefulness; and thus, in the outset, determine the merit that constitutes the requisite upon which a law of title is founded. In the invention of a device, is created a title to it by the inventor himself; and he holds his title against the world, independent of statute enactment, and without fear of fraud, so long as he keeps the production of his mind a secret from his fellow-men. He thus has not only possession, but the right of possession, and the right of property in it, which together complete his title. It is its disclosure, and the resulting benefit to the public, for which the law designs a correspondent benefit to himself; and to this end, carefully guarding the rights of all, it is asked that a modification which shall meet the case be enacted. I would therefore respectfully solicit for this subject the attention and favorable consideration of Congress.

The law now permits what is termed a "re-issue," embodying matter not claimed in the original patent, if shown by the model and drawings. It thus, in effect, makes a new claim admissible, for what originally, may not have been designed to be patented, or supposed to be of essential value. The device having been a part of the first construction of the machine, is now claimed; and, having been new at the date of the original application, a right to its exclusive use is demanded. The grant of this right, in many instances, interferes with machinery subsequently invented by others, thus cutting off such inventors from the benefit of its use. In support of the present construction of the law, it is alleged, that inasmuch as it was through inadver-

tence or mistake of the applicant in the first instance, that he did not include in his claim the feature desired to be embraced in the re-issue; a patent should now be granted lest the injustice be done of withholding the benefit of an invention actually his own, though not originally claimed. The law has made time and the public use of a device one test of its patentability. An inconsistency therefore, exists between a re-issue and an original application. In the latter case, prior use for two years is a bar to a patent, whereas in the case of a re-issue such prior use is no bar, and it may be granted at any time during the life of the patent. Thus a device may have been in public use for years, for which a patent on a re-issue is desired, but still no objection, under the present law, is made, if it comes within the scope of such an application. A just complaint may be made that devices of old patents, in a great degree inoperative as to any practical purpose, may be claimed on re-issue and an exclusive right to them procured, thus operating against a beneficial invention, containing the same feature subsequently patented or in common use. A system of tribute is in this way levied, originating with the indefatigable explorers of old and useless patents, whose object is to discover something which they may now claim under the law, and which can be used to legal advantage in defiance of equitable right. A party not the inventor presents an assignment of a worthless patent, obtained, perhaps, for a trifling consideration — procures the re-issue — and accomplishes his purpose. In my opinion the restriction of the law in the one case and the non-restriction in the other, are in principle at variance, to say nothing of the hardships arising from its practical operation. It is, therefore recommended that no re-issue, containing a claim broader than the original claim, be granted, unless application therefor be made within two years from the date of the letters patent.

By reference to the statement of receipts and expenditures of this office for the current year, it will be found that eleven thousand three hundred and fifty dollars and thirty-three cents has been refunded on withdrawals made previous to the first day of January, 1849. This sum has been drawn entirely from the income of the office for the past year, and although that amount is even greater than the sum carried to the credit of the patent fund for the year 1848, still it is but reasonable to suppose that the number of applications rejected must yearly increase in a far greater proportion than the number of patents issued, and thus, from year to year, the revenue of the office be decreased. From the report of '48, it will be found, that in a period of four years (from 1841 to 1845,) the number of rejections were only thirteen hundred and ninety-nine. For the period of four years following, they amount to three thousand three hundred and fifteen; and for the year 1849, to fourteen hundred and nine. It may therefore be confidentially anticipated, that the next like period of time will exhibit a corresponding increase of rejections compared with the patents issued. To provide for this contingency, it becomes necessary to devise means of increasing the receipts, and thus avoid a deficit which might otherwise occur. For this purpose, I would suggest the following amendments of the fiscal laws governing this office; and this is done with less hesitation inasmuch as they will merely serve to apportion more justly the fees demanded in each case to the services rendered.

First.—Whenever a patent is refused, the applicant is entitled to receive back two-thirds of the fee paid, leaving, in ordinary cases, for the services rendered by the office but ten dollars; whereas the actual expense of exami-

nation, &c., in this office is, on an average, much more than that sum, and the deficiency must be made up by others. Thus the quasi inventor, who has given nothing to the arts, fails to pay his proportion of the expense of the office, while the *real* inventor is required to make up the deficiency. It not unfrequently happens that the office is speculated upon by inventors and agents with regard to examinations. They find it (as some have admitted) cheaper to give the office ten dollars for the investigation of a case than to purchase the necessary books and examine for themselves. By this means an amount of labor is often involved, costing the office in almost every instance, more than the amount received. But this expense to the office is doubled, and often tripled, after the examination, by rehearings and by a correspondence with the disappointed applicant, continued from one to twelve months in duration. In view therefore of the foregoing considerations, I would recommend, that but *one-third* of the fee paid should be returned in cases of withdrawal. Upon this subject communications have been received from persons whose opinions are entitled to great consideration. The following extract is from a letter received from a gentleman who was fourteen years in this office, but who now, having no official connection with it, may be regarded as free from bias:

"As the increased expenditures of the Patent Office may produce a deficit in the revenues, and I had occasion some few years back to investigate this subject, I take the liberty of submitting for your consideration some suggestions which may aid you in determining the best course to be pursued.

"From my knowledge of inventors, I am safe in saying that they are willing to submit to the payment of a higher duty than thirty dollars for a patent, if it be necessary, in order to secure and maintain an efficient and prompt administration of the Patent Office.

"An efficient, judicious, and prompt examination of applications for patents is of the first importance to inventors; for on the efficiency and good judgment of the examination depends, in a great measure, the integrity of patents, and on the promptness of it, the success of the inventor's enterprise. There is no estimating the loss which inventors sustain by reason of delays in the grant of patents; if therefore an increase of fees should be required to maintain such prompt and efficient administration of the office, you may rest assured that your recommendation will be supported by nearly, if not all the inventors in the country. But I feel satisfied that this measure will not be necessary. The present law authorises the repayment of two-thirds of the fee paid into the treasury, on the withdrawal of an application, and as about one-half the applications are rejected, the withdrawals reduce the receipts of the office one-third, which if retained, would make the revenue amply large to cover all the expenses necessary to the desired efficiency of administration.

"I have never been able to see any sound reason for the provision of the law authorising withdrawals. A duty is imposed on applicants for patents, not as a payment to the government for the protection which it extends to the patentee, but simply to cover the expenses which the government incurs in adjudicating the claims of applicants, and in granting patents; and in view of this, it was estimated that thirty dollars for each application would cover the average expenses. Now, if it cost as much to examine and reject an application as it does to grant a patent, why should the patentee pay more than the unsuccessful applicant. From my experience, more labor is bestowed by the office on the rejected applications, than on the successful ones, and for this reason — the rejection can only be made after a careful and

laborious investigation — and the disappointed applicant never remains satisfied with one examination and rejection. He will persist in urging his claims, and often with the assistance of skilful counsel. The views submitted must be examined, and arguments answered, all of which involve much labor and require much skill. But with successful applications, the one examination is sufficient; and at most it is only necessary to see that the application is properly amended in accordance with the first examination. When the application is passed, there remains but the expense of engrossing and recording, which on the average, makes but a small part of the expense.

"I feel satisfied that after a careful examination you will find, that the rejected applications — those that have been withdrawn have cost the government more than the granted applications — and, if I am right, they should certainly cost the applicant as much.

"But there is another light in which this subject should be considered. The present law encourages the making of applications for matters of doubtful novelty; and in the course of my practice, I have often been told by applicants, after assuring them that there was no novelty in their alleged inventions, that they would nevertheless try, for if they failed it would only cost them ten dollars as they could withdraw twenty dollars.

"In view of all this, would it be just to impose an additional duty on patentees — the real inventors, who really confer a benefit on society—to shield the unworthy applicants or the pirates who seek to obtain surreptitious patents for the inventions of others.

"If there be any justice in requiring the payment of a duty to defray the expenses of the Patent Office, unsuccessful applicants should be required to pay as much as patentees." * * * * * * * *

Second. — A fee of twenty dollars is required upon the filing of a caveat. Upon the filing of the application by the caveator, the whole fee of twenty dollars is allowed in the fee for the application, leaving nothing for the caveat; so that he who has the benefit of the caveat and the application also, pays no more than he who files his application merely. Caveats are a source of constant labor, anxiety and expense to the office, and he who files them and derives from them security for his rights, should, in common justice, pay the expenses they impose upon the office; for unless the expense is paid by him who derives the benefit, it must fall on those who do not. I would, therefore, recommend that twenty dollars, as heretofore, be required upon the filing of each caveat, but that only ten dollars of this fee be allowed in part payment of fees on completing the application.

Third.—The law now in force allows a patentee to take out a patent for any additional improvement made upon his patented invention, upon the payment of *fifteen dollars*, whether he be a citizen of the United States or a foreigner. There seems to be no just reason for this distinction between fees for original patents and for letters patent additional. The nature of the invention is the same in both cases; and the questions which arise under the original, arise also under the application for additional letters patent. There are, moreover, some questions to be settled under the latter application, which do not arise in the former. On the whole, the actual expense to this office attending the grant of letters patent additional, or the rejection of an application therefor, are at least as great as in cases of an original application. A distinction in the fees could hardly have arisen from a correct apprehension of the subject. Besides, the privilege of receiving this patent *for half the usual fee*, is confined to the prior patentee; but,

if one of his neighbors invent the same thing, he must pay the full fee of thirty dollars for his patent. If a subject of the Queen of Great Britain, be the patentee, he can take out a patent for his improvement for fifteen dollars; while any one of his fellow subjects would be required to pay five hundred dollars for a patent for the identical improvement. There is obviously a burdensome discrimination in the provision in question, and by the distinction made, the law becomes partial in its operation. I would therefore recommend that all provisions in relation to letters patent additional, be repealed as unnecessary and unequal. Unnecessary, because, if such improvements are patentable at all, they are so under the general provisions of the law; and unequal, because they extend privileges to a few which are withheld from the many; and that without any peculiar merit on the part of those privileged.

Fourth.—The foregoing objections apply with equal force to the law which provides for the re-issue of patents upon payment of a fee of fifteen dollars. All the labor and expense attending the grant of letters patent in *any case*, are required in a case of re-issue; and, in addition to those which are usual, other questions sometimes of great difficulty arise. It is not sufficient to determine whether the thing claimed in the re-issue is new, but it must be determined whether it was new when the patent was granted. This precise ascertainment of dates, therefore, requires much careful research, and consequent labor, which would be wholly unnecessary in ordinary cases. In other particulars, these cases often require more care and labor than is usual with common applications; and it is safe to say that each application for a re-issue costs this office nearly double the ordinary expense of applications upon which the full fee is paid. It is therefore recommended that upon all application for re-issue of patents, at least the full fee of thirty dollars should be paid, and that no part of it be returned in case of rejection.

The foregoing suggested amendments ought, in my opinion, to be made upon a simple ground of a fair division of the expenses of this office among those whose interest it was established to protect, even though no increase of revenue were required. Should too much revenue accrue, a *general* diminution or reduction of fees should be adopted, instead of relieving one class of applicants from their just proportion of the burden and imposing it upon another.

It has been proposed to grant "patents of importation," agreeably to the practice of England, France, Belgium, and other countries, with the view that valuable inventions, now supposed to be used in secret, may be brought from abroad. On the other hand, it is alleged, and with reason, that the granting of monopolies to mere introducers, regardless of the rights of authors, is no better than fostering espionage and legalizing fraud; establishing premiums for the most adroit of freebooters. Certain it is, not a few American inventors suffer by the practice. It has almost become a regular business for patent speculators to cross the Atlantic with discoveries surreptitiously obtained, and after securing or selling them, to laugh at the owners for not being sufficiently alert to reap the advantage themselves. The system is unworthy of an enlightened people, and can never be adopted without reacting, sooner or later, on those who uphold it. That which is fraudulent between individuals can hardly be anything else when a government is a party, no matter by what name the transaction may be designated, nor by what pretences justified. If a new machine or manufacture is beyond our imitation, without instruction as to its production, it ought to remain so till

we study the secret out. Our laws award patents to "original inventors," or their assignees. This is what the highest morality demands, and in its working it has proved consonant to the soundest policy. In every point of view, it would, in the opinion of the undersigned, be better to adhere to it, than to adopt the devious practice prevailing elsewhere. The general sentiment of the age, on these matters, is fast ripening; and soon international policy will no longer sustain the spoliation of "true inventors," let them be located where they may.

There may be special exceptions to the opinions thus stated, and these would consist of processes of manufacture not new in the country where they are employed, not the property of any individual, and studiously withheld from publication by the authorities of the state, thus monopolizing a peculiar branch of manufacture. When such processes are discovered and introduced, Congress has the power, by special legislation, to reward the introducer, and such legislation would be, I conceive, all that a sound policy could recommend in the matter of granting patents for introduction.

To furnish a synopsis of Patented Inventions from 1790 to 1850, the subjoined analytical tables, (marked J.) have been prepared by Mr. Lawrence, Chief Clerk, in which he has particularized the several states to whose citizens the patents were issued. Great pains have been taken in their compilation and every person interested in marking the progress of invention on this continent, can hardly fail to be gratified in perusing them.

[A.]

Statement of receipts for patents, caveats, additional improvements, re-issues, extensions, recording assignments, &c., and for certified copies.

Amount received for patents, caveats, re-issues and additional improvements,	$75,690 00
Amount received for recording assignments, &c., and for copies,	4,873 17
Amount received of L. B. Shepherd, United States District Attorney, New York, recovered of Brown and Maher, for violation of act of May 29th, 1842,	150 00
Amount received on sale of old matting, &c.,	39 61
	$80,752 78

[B.]

Statement of expenditures and payments made from the Patent Fund by the Commissioner of Patents from January 1st, 1849, to December 31st, 1849, inclusive, under the act of March 3d, 1837, and subsequent acts of Congress making provision for the expenses of the Patent Office, viz:

For salaries,	$29,072 11
" Contingent Expenses,	12,367 70
" Books for Library,	2,748 41
" Temporary Clerks,	10,040 01
" Agricultural Statistics,	3,395 76
" Refunded money paid in by mistake,	509 12
" Analysis of breadstuffs,	1,400 00
" Librarian,	290 00

For Withdrawals,	$17,793 33
" Compensation of District Judge,	100 00
	$77,716 44

[C.]

Statement of the Receipts and Expenditures of the Patent Office for the year 1849.

Amount received from all sources,	$80,752 78
Amount of expenditures of all kinds,	77,716 44
Amount carried to the credit of the Patent Fund for the year 1849,	$3,036 34

[D.]

Patent Fund, January first, 1850.

Amount of fund on 1st January, 1849,	$216,468 83	
" drawn out for erection of wings to Patent Office,	50,000 00	
		$166,468 83
Amount carried to credit of Patent Fund for 1849,		3,036 34
Amount remaining in Treasury to credit of Patent Fund, January 1st, 1850,		$169,505 17

[E.]

Statement of applications on hand January 1st, 1849, *and number received during the year and acted upon.*

No. of cases on examiners' desks, January 1st, 1849,		539
" applications received in 1849,		1,955
" before the office during the year,		2,494
" of Patents issued during the year,	1,076	
" applications remaining unexamined,	9	
" of rejections and suspensions,	1,409	
		2,494

[F.]

CLASSIFIED LIST OF PATENTS

THAT HAVE EXPIRED DURING THE YEAR 1849.

CLASS I.—AGRICULTURE, *Including Instruments and Operations.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Bee-hive	Samuel Morrill	Dixfield, Maine	Jan. 16, 1835
Bee-hive	Orlando Mack	Gilsum, N. H.	Apr. 22, "
Bee-house	William Groves	Harrisburg, Pa.	June 12, "
Cheese, turning and curing	Henry Webber	East Richfield, N. Y.	Apr. 22, "
Churn	Iram Brewster	Schoharie co., N. Y.	Jan. 7, "
Churn	Francis Colton	New York	Jan. 9, "
Churn	Benjamin Randall	North Pownall, Me.	Mar. 11, "
Churn	Samuel Clark	Parkman, Maine	Apr. 22, "
Churn	Philip S. Lowell	Farmington, Maine	May 29, "
Churn	Michael Knight	Pownall, Maine	May 9, "
Churn	Isaac Wood	Fayette co., Ind.	June 26, "
Churn	Oliver Wyman	Dedham, Mass.	July 17, "
Churn	Hiram Phelps	Williston, Vt.	July 21, "
Churn	William A. Herrick	Green, Maine	July 21, "
Churn	Russel Bradley	Williston, Vt.	July 21, "
Churn	Joseph Turner	Poland, Maine	Aug. 15, "
Churn	Caleb Angevine	New York	Aug. 17, "
Churn	Clifton C. Stearns	Buckport, Maine	Aug. 17, "
Churn, cutting floats of	Reading Ryerson	Jay, Maine	July 17, "
Churn, propelling and cradles	Ezra Whitman, Jr.	Winthrop, Maine	Mar. 27, "
Churn, propelling by weights	Asahel Bacon	Windsor, N. Y.	Oct. 10, "
Churn, spiral spring	Lewis Hinkson	Hallowell, Maine	Jan. 7, "
Churn, and washing machine	Ira Park	Delhi, N. Y.	Jan. 16, "
Churn, and washing machine	Charles Otis	Finksburg, P. O. Md.	June 12, "
Churn, and washing machine	Thomas Ling	Winthrop, Maine	Sept. 9, "
Corn sheller	J. H. Taylor and A. J. Cowles	Westfield, N. Y.	Feb. 11, "
Corn sheller	Eph. Rand and Adna L. Norcross	Hallowell, Maine	Feb. 13, "
Corn sheller	Dunbar and Powers	Portland, Maine	June 26, "
Corn sheller	John P. Small	Gilmanton, N. H.	July 21, "
Corn sheller	Joseph Turner	Portland, Maine	Aug. 15, "
Corn sheller	Elijah Morse	Knoxville, Tenn.	Sept. 9, "
Corn sheller	James S. Harris	Poultney, Vt.	Sept. 18, "
Corn sheller and cleaner	Robert Gray	Northfield, N. Y.	Jan. 16, "
Cotton thinner	Gordon Gatling	Murfreesboro', N. C.	June 19, "
Cultivator	David Davis	Fredericksburg, Va.	July 17, "
Cutting cradle for grain	Edward Badlum, Jr.	Chester, Vt.	Sept. 18, "
Cutting grain, grass seed collector	D. Ashmore and J. Peck	Jefferson co., Tenn.	Sept. 18, "
Cutting grain, and rake	Abraham Rundell	Verona, N. Y.	Apr. 22, "
Cutting grass	Sturdivant and Holmes	Portland, Maine	June 19, "
Cutting grass	John P. Chandler	Milton, Maine	Aug. 17, "
Graineries, wheat, &c.	John Harmony	Chambersburg, Pa.	Aug. 20, "
Hulling clover seed	Stacy West	Harford county, Md.	Jan. 16, "
Hulling clover seed, and cleaning	Joseph Ross	Boundbrook, N. J.	Feb. 6, "
Hulling clover seed, and rice	Brayley and Walker	Phillips, Maine	June 6, "
Hulling coffee berry	Isaac Adams	Boston, Mass.	Jan. 13, "
Hulling coffee berry	Thos. Ditson	Boston, Mass.	Jan. 13, "
Hulling cotton, clover, and other seed	John Whiteman	Philadelphia, Pa.	June 26, "
Hulling cotton seed	Miller and Lawes	Washington co. Miss.	Oct. 21, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Hulling cotton seed, and rice	Sirah Kellogg	N. Hanover co. N.C.	Mar. 30, 1835
Hulling rice, polishing	William Searbrough	Savannah, Ga.	Apr. 14, "
Lime, &c., spreading	Julius Hatch	Great Bend, Pa.	Aug. 17, "
Lime, &c., sowing	Julius Hatch	Great Bend, Pa.	Aug. 17, "
Plough	David Ghormley	Wayne town'p, Ohio	Feb. 13, "
Plough	Nathan Robinson	Sackett's Har. N. Y.	Feb. 13, "
Plough	Joseph Tinkler	Warwick t'p, Ohio.	Mar. 2, "
Plough	Nathan Baker	Penn township, M.T.	Mar. 24, "
Plough	William Hess	Lower Saucon, Pa.	Mar. 27, "
Plough	Samuel Cline	Plumstead, Pa.	July 17, "
Plough	P. Stahl and John Diffenbacher	Turbet, Pa.	Sept. 18, "
Plough	William Walker	Washingtonville, Pa.	Oct. 6, "
Plough	Jarius S. Tefft	Amherst, N. Y.	Oct. 17, "
Plough, breaking & cultivating, &c.	Guy Gray	Industry, Maine	Sep. 18, "
Plough, carey bull	Benjamin Johnson	Hickory Grove, Ill.	Feb. 20, "
Plough, coulter and shares	Samuel A. Sperry	A. Arborville, M. T.	Oct. 27, "
Plough, hill side, inverting, &c.	John W. Jordan	Lexington, Va.	Oct. 28, "
Plough, polyshare	Frederick Brewster	Burlington, Vt.	Jan. 24, "
Ploughshare, coulter, and mould board	William Holt	Buffalo, N. Y.	Aug. 27, "
Rake, horse	Noah Briggs	New Hartford, N. Y.	Feb. 11, "
Rake, horse	James Pudney	Stanford, N. Y.	Nov. 7, "
Seeding, corn planter	Thomas D. Burrall	Geneva, N. Y.	June 26, "
Seeding, cotton planter	Michael Beam	Buffalo, N. C.	Feb. 13, "
Seeding, cotton planter	Jordan Gatling	Murfreesboro', N. C.	June 20, "
Seeding, cotton planter	Robert T. Goodman	Ballsville, Va.	Sep. 18, "
Smut machine	Thomas J. Sands & Benjamin Kendig	Washington t'p, Pa.	Mar. 18, "
Smut machine	John Card	Gainesville, N. Y.	June 20, "
Smut machine	John Turk	Columbus, Pa.	Nov. 7, "
Smut machine	Edward P. Fitzpatrick	Mount Morris, N. Y.	Nov. 14, "
Smut machine, and garlic	Abraham Hurst	Allen township, Pa.	Jan. 23, "
Straw cutter	Nimrod Murphree	Nashville, Tenn.	Jan. 21, "
Straw cutter	Stephen Ustick	Philadelphia, Pa.	Feb. 5, "
Straw cutter	John Deakyne	Petersburg, Va.	April 2, "
Straw cutter	John W. Cope	Franklin co., Tenn.	Ap'l 22, "
Straw cutter	Stephen Ustick	Philadelphia, Pa.	May 29, "
Straw cutter, &c.	James McMath	Crawford, Pa.	June 26, "
Straw cutter	Earnst G. Augustin.	New York	July 6, "
Straw cutting	Ashman Hall	Kent, N. Y.	Nov. 7, "
Straw, cutting cabbage, paper, &c.	Henry C. Jones	Salem township, O.	Nov. 7, "
Straw, cutting, and corn sheller	William Denson	Morgan county, Ala.	May 2, "
Thrashing and cleaning grain	Alexander Porter	New Vineyard, Me.	Jan. 23, "
Thrashing grain, &c.	John Gearheart	Rush township, Pa.	Aug. 27, "
Thrashing and hulling grass seed	Samuel Gould	New Portland, Maine	Aug. 15, "
Thrashing, hulling, and shelling	Jesse S. Dick	Genesee co., N. Y.	Mar. 13, "
Thrashing machine	Luke Hale	Hollis, N. H.	Jan. 7, "
Thrashing machine	Joseph Ross	Boundbrook, N. J.	Feb. 6, "
Thrashing machine	Thomas D. Burrall	Geneva, N. Y.	Mar. 6, "
Thrashing machine	David G. McCoy	Dublin, Md.	Mar. 20, "
Thrashing machine	William W. Ross	Chillisquaque t'p, Pa.	Mar. 30, "
Thrashing machine	Luther Carman	Oxford, Maine	April 2, "
Thrashing machine	William G. Johnson	Bridgetown, N. J.	April 3, "
Thrashing machine	Samuel S. Allen	Saratega Sp'gs, N.Y.	April 3, "
Thrashing machine	Henry Heberling	Harrison co., Ohio.	April 8, "
Thrashing machine	James Whitehill	Frederick co., Md.	Ap'l 22, "
Thrashing machine	S. C. Sneed and W. S. Carpenter	Albemarle co., Va.	May 9, "
Thrashing machine	Washington F. Pagett	White Post, Frederick county, Va.	May 22, "
Thrashing machine	Edmund Warren	New York	May 29, "
Thrashing machine	Henry Johnson	Washington co., Ten.	May 29, "
Thrashing machine	William Laighton	Portsmouth, N. H.	June 6, "
Thrashing machine	T. Rucker, Jr., assignee of P. Cheek	Murfreesboro', M.T.	June 12, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Thrashing machine	Joseph Tyler	Brooklyn, Conn.	July 7, 1835
Thrashing machine, chaffing straw	Russel Bradley	Williston, Vt.	Oct. 6, "
Thrashing machine, clover	John P. Ridings	Hillsborough, Ohio	June 19, "
Thrashing machine, clover, &c.	A. Burgess and H. Baldwin	Washington, Conn.	Oct. 10, "
Thrashing machine, clover and rice	Moses Davenport	Philips, Maine.	Oct. 6, "
Thrashing machine, portable	H. and J. W. Edgar	Wayne county, Ohio	June 6, "
Thrashing machine, for rice, &c.	William Mathews	Charleston, S. C.	Aug. 27, "
Trees, &c., mode of felling	James Hamilton	New York	June 26, "
Washing potatoes and roots	William Ellis	Waterville, Maine	Feb. 25, "
Weevil, mode of destroying	James A. Lee, administrator of James Lee	Maysville, Ky.	Aug. 17, "
Winnowing clover seed	Hiram Hoth	Weld, Maine.	Sep. 26, "
Winnowing machine	Truman B. Brown	Locke towns'p, N.Y.	Mar. 6, "
Winnowing machine	Jeremiah Nichols	Kent county, Md.	June 15, "
Winnowing machine	Edward P. Fitzpatrick	Mount Morris, N. Y.	Nov. 14, "

CLASS II.—METALLURGY *and Manufacture of Metals.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Awls, drills, &c., setting	Erastus B. Bidgelow and Stephen P. Brigham	W. Boyleston township, Mass.	Jan. 27, 1835
Bars, for grates and stoves	Jordan L. Mott	New York	Oct. 14, "
Brads, cutting, revolving	Asa B. Woods and Eb. Talbot, Jr.	Windsor, Conn	Feb. 13, "
Brand	Eli Barnes, G. Hill and S. B. Hawkins	Ashtabula, Ohio.	Feb. 25, "
Castings, chilled cylinders & cones	James Harley	Pittsburgh, Pa.	Mar. 3, "
Castings, metallic pin for chilling the interior of	William H. Saunders	Greensburg, N. Y.	Nov. 26, "
Castings, mould for iron pipes, &c.	John D. Morris	Kensington, Pa.	Dec. 2, "
Castings, smoothing the oxide and sand on	Bradford Seymour	Utica, N. Y.	Dec. 2, "
Door, wire springs for	John Codman	Boston, Mass.	Aug. 17, "
Fire-proof chest	John Scott	83 Dock street, Philadelphia, Pa.	July 21, "
Flasks and patterns for iron tea kettles	David Steward	Danville, Pa.	June 26, "
Flat or sad iron, tenon and mortise attached	William Wilson	Greenfield, Mass.	Mar. 27, "
Forges and bellows, for blacksmiths, &c.	John C. Conklin	Peekskill, N. Y.	June 19, "
Forges, backs, blacksmiths	Isaac Sawyer	Hallowell, Me.	Feb. 13, "
Forges, backs, blacksmiths	James Knickerbacer	Laporte, Ind.	Sep. 26, "
Forge and other furnaces, application of air	S. W. Watson and C. Robinson	Ashtabula, Ohio.	Sep. 26, "
Forge, hearth, hot air	L. V. Badger and R. Walker	Portsmouth, N. H.	Nov. 30, "
Furnace, hot air, and cupola	L. V. Badger	Portsmouth, N. H.	Dec. 2, "
Furnace, smelting ore and burning lime	John Owings	Adams county, Pa.	May 29, "
Gold, amalgam mill for separating from ore	Joseph Curtis	New York	Dec. 28, "
Gold, amalgam mill for separating from ore	Joseph Curtis	New York	Dec. 28, "
Gold, amalgam mill for separating from ore	Joseph Curtis	New York	Dec. 28, "
Gold, extracting from ore, &c.	Nathaniel Bosworth	Philadelphia, Pa.	June 6, "
Hinges and tubes	William Shaw	Buffalo, N. Y.	Oct. 22, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Hoes, manufacturing	Isaac Hinman	Hamden, Conn	Ap'l 22, "
Knobs, screw for glass	Orrin Newton	Pittsburgh, Pa	Oct. 17, "
Latch and lock, for doors	Albert Bingham	Unity, Me	July 7, "
Lock, door, and other fastenings	J. R. Campbell and H. C. Campbell	Charlestown, Mass	Dec. 28, "
Locks, mortise and latch	J. G. Hotchkiss	New Haven, Conn	June 19, "
Locking, number of drawers	Edward Brown	Lynchburg, Va.	Oct. 28, "
Nails, machine, nippers for Reed's	Stephen Chubbuck	Wareham, Mass.	Jan. 13, "
Nails, wrought	Samuel G. Reynolds	Providence, R. I.	Mar. 18, "
Rolling metals	Isaac Hinman	New Haven, Conn	Ap'l 22, "
Saw teeth, cutting	Andrew T. Mervin	Borough of Muncy, Pa.	Oct. 28, "
Saw set	Herrick Aiken	Middlesex, Mass.	June 12, "
Saw set	Theodore Taylor	Port Deposite, Md.	Aug. 15, "
Shoes, horse	Henry Burden	Troy, N. Y.	Nov. 23, "
Shovel, scoop	John and Wm. Smith	Williamston, Mass.	Feb. 25, "
Tin ware, seaming	James Redheffer	Bridgetown, N. J.	Mar. 6, "
Trip hammer	Heman Redfield	Grafton, Mass.	Mar. 6, "
Window blinds and door	Seril Steere	Gloucester, R. I.	Mar. 25, "
Window sash, bolt and spring	Marcus Merriman, Jr.	New Haven, Conn.	Ap'l 14, "
Window sash, cast iron	James S. Stoddard	Macedon, N. Y.	Oct. 14, "
Window sash, spring and catch	Menson L. Stevens	Waterbury, Conn.	Jan. 9, "
Wrench, screw	Solyman Merrick	Springfield, Mass.	Aug. 17, "

CLASS III.—MANUFACTURES *of Fibrous and Textile Substances, including Machines for preparing Fibres of Wool, Cotton, Silk, Fur, Paper, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Cloth, dressing, calendering	Zenas Bliss	Johnston, R. I.	Oct. 17, 1835
Cloth, manufacturing	Freeman Wolcott	Stow, Mass	July 21, "
Cloth, winding up	J. Goulding and R. Brackett	Boston, Mass.	Nov. 30, "
Cordage, rope, laying	John Goulding	Boston, Mass.	Oct. 10, "
Cordage, rope, serving	James Fales	New Bedford, Mass.	Aug. 20, "
Doffer	Stephen H. Parkhurst	Providence, R. I.	Oct. 10, "
Flax and hemp, breaking	Ferdinando Stith	Franklin, Tenn.	Ap'l 22, "
Flax and hemp, preparing, &c.	John Goulding	Boston, Mass.	Aug. 17, "
Flax and hemp, and tow hatcheling	John Goulding	Boston, Mass.	Oct. 10, "
Fulling mill, stocks, propelling	Elisha O. Norris	Monmouth, Me.	July 7, "
Fur, cutting machine, reciprocating	Curtis M. Lampson	New York	Feb. 5, "
Fur, extracting hair from	Sam'l G. Ladd, assignee of Seth Graham	Farmington, Me.	Mar. 27, "
Fur, substitute for dressed fur skins	Allen Belden	Hudson, N. Y.	Ap'l 22, "
Gin, cotton, boxing for	William S. Cooley	Norwich, Conn	Jan. 7, "
Gin, cotton, roller	William Whittimore, Jr.	W. Cambridge, Mass	May 29, "
Hair, extracting from skins	Nahum Swett	Redfield, Me.	Nov. 14, "
Hat blocks	A. and S. Chichester	Wilton, Conn.	May 29, "
Hats, bodies, stiffening	Henry Blynn	Newark, N. J.	May 9, "
Hats, bonnets, &c.	Elisha Pratt	Cambridge, Mass	May 16, "
Loom	Oliver C. Burr	Milbury, Mass.	July 17, "
Loom, damask	Tompkins and Gilroy	N. Providence, R. I.	May 9, "
Loom, power	David Whitman	Windham, Conn.	Mar. 20, "
Loom, power	William G. Gavit	Washington county, R. I.	Ap'l 8, "
Loom, power, for silks	Gamaliel Gay	Poughkeepsie, N. Y.	Sep. 26, "
Loom, power, and taking up motion	Amasa Stone	Johnston, R. I.	Aug. 17, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Loom, power, weaving stock frames	F. Goodell and F. H. Harvey	Ramapo, N. Y.	Dec. 2, 1835
Loom, reeds, heddles or harness	Jeptha A. Wilkinson	Providence, R. I.	July 17, "
Loom, weaving, figured goods	John Smith	Shaefferstown, Pa.	Ap'l 22, "
Loom, weaving, stocks	Conrad Kile	Erie, Pa.	Sep. 18, "
Napping, cloth	Reuben Daniels	Woodstock, Vt.	June 26, "
Paper machine	John Ames	Springfield, Mass.	Feb. 20, "
Silk, throwing or twisting	Lucillias H. Mosely	Poughkeepsie, N. Y.	May 9, "
Silk, unwinding	Gamaliel Gay	Poughkeepsie, N. Y.	Aug. 17, "
Spinning, accelerated	Leonard Norcross	Dixfield, Me.	June 15, "
Spinning, hemp and flax	Andrew Caldwell	Lexington, Ky.	Aug. 20, "
Spinning, roping, and doubling cotton, silk, &c.	James Jones	Manchester, Eng.	May 16, "
Spinning, speeder, double	William Field	N. Providence, R. I.	Oct. 6, "
Spinning, spindle, dead	Henry G. Davis	Northborough, Mass.	Sep. 9, "
Spinning, spindle, rotary and stationary	Charles Jackson, St. S. Potter and John Miller	Providence, R. I.	Ap'l 2, "
Spinning and twisting, straw, hay, &c.	Philo G. Sheldon	Winchester, Conn.	Ap'l 8, "
Tenter bars, circular	Stephen R. Parkhurst	Worcester, Mass.	Oct. 28, "
Whipper, cotton, oblique	Lucien Osgood	Abbington P. O., Ct.	Oct. 27, "
Wool, cleaning	Michael H. Simpson	Boston, Mass.	July 7, "
Wool, combing	Samuel Cauillard, Jr.	Boston, Mass.	July 7, "
Wool, or flax, to brush into teeth	William W. Calvert	Lowell, Mass.	Sep. 18, "

CLASS IV.—CHEMICAL PROCESSES, MANUFACTURES, AND COMPOUNDS, *including Medicine, Dying, Color-making, Distilling, Soap and Candle making, Mortars, Cements, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Alcohol, extracting from apples	Anson Wolcott	E. Bloomfield, N. Y.	Oct. 6, 1835
Anodyne, and alterative syrup	Rezin Thompson	Rome, N. Y.	Nov. 14, "
Bleaching cloth, and cleaning	Calvin H. Farnham	Norwich, Conn.	Aug. 15, "
Candle wick, dipping and cutting	Willard Morey	Worcester, Mass.	Aug. 15, "
Caoutchouc, spreading and drying upon cloths	William Atkinson	New York	Oct. 6, "
Cement, for blocks, pillars, &c.	Charles Clinton	Minnisink, N. Y.	Oct. 28, "
Cement, for cisterns	Roberts and Carson	New York	Oct. 17, "
Cement, gum-elastic	Charles Goodyear	New Haven, Conn.	Sep. 9, "
Cement, hydraulic	Parker, Clowes and Garfield	New York	Aug. 27, "
Cement, hydraulic	Obadiah Parker	New York	Sep. 9, "
Composition, for medical purposes	Robert S. Bernard	Norfolk, Va.	Aug. 17, "
Composition, pencils, points, &c.	Guy C. Baldwin	Ticonderoga, N. Y.	Dec. 2, "
Composition, to prevent absorption of animal and fish oils,	Nathan Hathaway	Fairhaven, Conn.	May 22, "
Composition, supplying lamps	Henry Porter	Bangor, Maine	April 8, "
Composition, water proof, for roofs	Lyman Garfield	Troy, N. Y.	Feb. 20, "
Distilling apparatus for spirits of turpentine	Josiah Jennings	New York	Aug. 27, "
Dyeing, with alkaline prussiates	Felix Fossard	Philadelphia, Pa.	Nov. 7, "
Dyeing and printing woolen cloths	William Duncan	Bellville, N. Y.	Sep. 18, "
Galvanic electricity, to cure diseases	Daniel Harrington	Philadelphia, Pa.	Mar. 31, "
Galvanic electricity, applied to the surface of the human body	Daniel Harrington	Philadelphia, Pa.	April 8, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Glue, manufacturing	Jonathan Morgan	Portland, Maine	Sep. 18, 1835
Ink, writing	John D. Myers	New York	Sep. 26, "
Japan, applied to leather	William Gates	Hanover, N. Y.	Nov. 14, "
Mead, composition	T. T. Kimball and A. H. White	Dedham, Mass.	Sep. 26, "
Oil of hazze, preparation of	Preswick and Fisher	New York	Aug. 17, "
Oil, linseed, substitute for	Todd and Peabody	Washington, D. C.	July 7, "
Ointment, cure of diseases	William Waller Gray	Richmond, Va.	Mar. 18, "
Paint, composition, metallic oxide for white	Forest Sheppard	Fredericksburg, Va.	Mar. 18, "
Potash, manufacturing	Hartsuff and French	Aurelius, N. Y.	July 17, "
Potash, manufacturing and leaching ashes	Elijah Williams	Harbor Creek, Pa.	Aug. 16, "
Salts, manufacturing, by solar evaporation	Edward C. Cooper	New York	May 16, "
Sugar, boiling, &c., under a vacuum	John Steel, Jr.	New York	Oct. 27, "
Sugar, moulds for loaf	Charles Duncan	Williamsburg, N. Y.	Oct. 27, "
Vinegar, mode of making	Frederick N. Boden	N. Lancaster, Ohio.	July 6, "
White and whiting, Paris	Peter Ferris	Greenwich, Conn.	Ap'l 22, "

CLASS V.—CALORIFIC, *comprising Lamps, Fire-places, Stoves, Grates, Furnaces for Heating Buildings, Cooking Apparatus, Preparation of Fuel, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Asbestos, use and application of, to stoves, grates, crucibles, &c.	John Scott	Philadelphia, Pa.	Nov. 26, 1835
Baker, tin	Nathaniel D. Whiten	New York	Oct. 10, "
Blower, spiral cone	Benjamin Brundred	Oldham, N. J.	Sep. 26, "
Boiler, kitchen	J. and W. C. Bailey	Farmington, Me.	May 22, "
Boiler, portable	Anson W. Spencer	Cazenovia, N. Y.	June 19, "
Charcoal burner, conical arch	Ezra B. Gilbert	Euphrata, N. Y.	Nov. 7, "
Chimneys and fire places	Moses Perin	Connersville, Ind.	Sep. 26, "
Coal, anthracite, cracking	Jonathan S. Hubbel	New York	Aug. 17, "
Cooking, applying the reflection of caloric	John Burch	Jefferson co., N. Y.	Ap'l 22, "
Cooking, ranges	Thomas B. Smith	New York	Aug. 27, "
Cooking stove	Paul Wing	Grafton, Mass.	Feb. 25, "
Cooking stove	Andrew Abbott	Portland, Me.	April 2, "
Cooking stove	Thaddeus Fairbanks	Caledonia co., Vt.	Ap'l 14, "
Cooking stove	Resor, Wade and Resor	Cincinnati, Ohio.	May 29, "
Cooking stove	Elijah Skinner	Sandwich, N. H.	June 12, "
Cooking stove	Legrand Fairman	Orleans co., N. Y.	June 26, "
Cooking stove	Thomas D. Burrall	Geneva, N. Y.	June 26, "
Cooking stove	Solomon Dickinson	Richmond, Ind.	Aug. 15, "
Cooking stove	Ezekiel Gore, Jr.	Gilford, Vt.	Aug. 17, "
Cooking stove	Edward N. Kent	Portland, Me.	Aug. 17, "
Cooking stove	J. Whiting and J. Mears	Boston, Mass.	Sep. 9, "
Cooking stove	Ezekiel Daboll	N. Canaan, Conn.	Sep. 26, "
Cooking stove	Elnathan Sampson	Pierpont, N. Y.	Oct. 10, "
Cooking stove	Horatio B. Wade	Cincinnati, Ohio.	Oct. 17, "
Cooking stove	Bennington Gill	New York city	Dec. 9, "
Cooking stove, baking	Hiram G. Phelps	Johnstown, N. Y.	May 29, "
Cooking stove, correcting bad smell	Eliphalet Nott	Schenectady, N. Y.	Jan. 7, "
Cooking stove and fire place	Joshua Douglass	S. Durham, Me.	Nov. 14, "
Cooking stove, flat	Joel Rathbone	Albany, N. Y.	Mar. 6, "
Cooking stove, and Franklin	Isaac McNavy	Stafford, Conn.	Mar. 24, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Cooking stove, plain, plate or box.	Eliphalet Nott	Schenectady, N. Y.	Ap'l 22, 1835
Cooking stove, portable	John Igget	Albany, N. Y.	Jan. 16, "
Cooking stove, reflection of caloric	John Burch	Jefferson co., N. Y.	Ap'l 22, "
Cooking stove, salamander	Abraham D. Spoor	Coxsackie, N. Y.	Jan. 7, "
Cooking stove, self-heat retaining.	Moffat & Taintor	Buffalo, N. Y.	July 17, "
Cooking stove, three boiler, flat	Sylvester Parker	Troy, N. Y.	Jan. 16, "
Cooking stove, and warming rooms	Ernst G. Augustin	New York	July, 6, "
Fire, alarm	B. Seymour & J. Whipple	Utica, N. Y.	Ap'l 2, "
Fire, draught, &c	Robert Mayo	Washington, D. C.	Sep. 9, "
Fire-place	Skinner and Bean	Sandwich, Conn.	June 12, "
Fire-place	Ebenezer S. Greeley	Dover, Me	Oct. 6, "
Fire-place and chimney	Reuben Bacon and Elijah Harris	Boston, Mass.	Ap'l 8, "
Fire-place and chimney, funneled.	Ansel Gerrish	Shapleigh, Me.	Jan. 23, "
Fire-place, cooking and baking	John C. Howard	Howard's Valley, Ct	Oct. 27, "
Fire-place, for grates	Joseph Snyder	Philadelphia, Pa.	June 12, "
Fire-place, and grate	Charles Lane	Hingham, Mass.	Dec. 15, "
Fire-place, sheet iron	Gilbert Richards	Ashfield, Mass.	Nov. 26, "
Furnaces, adjustment of, &c	Eliphalet Nott	Schenectady, N. Y.	Ap'l 22, "
Furnaces, for anthracite	M. Brook Bulkley	Pottsville, Pa.	Jan. 16, "
Furnaces, and bake-oven	Charles E. Russell	Philadelphia, Pa.	Feb. 13, "
Grates	Barnabus Pike	New York	Mar. 11, "
Grates, stoves and furnaces	Elias W. Newton	Middletown, Conn.	Jan. 9, "
Grates and stoves, parlor and kitchen	Elkanah Ingalls	Providence, R. I.	Ap'l 22, "
Gridirons, rotary	Kellogg Strong	Mendon, Conn.	Oct. 28, "
Kiln for drying grain	Thomas Crook	New Hope, Pa.	Nov. 20, "
Kitchen ranges	Eliphalet Nott	Schenectady, N. Y.	Ap'l 22, "
Lamp-wicks, raising and lowering	Samuel Rust	New York	Oct. 6, "
Ovens, baking and heating houses.	Jacob Baldwin	New York city	Oct. 27, "
Ovens, construction and application	Samuel Pollard	Bucksport, Me.	June 12, "
Ovens, portable	Charles Vale	Newark, N. J.	June 26, "
Slabs, for fire-brick and stoves, lining, &c	Joseph Putnam	Salem, Mass.	Aug. 20, "
Stoves	George J. Payne	Boro' of Erie, N. Y.	Mar. 6, "
Stoves	Jordan L. Mott	New York	July 21, "
Stoves	Daniel West and Ferdinand Von Sickle	Hudson, N. Y.	July 21, "
Stoves, anthracite coal	Jacob J. Janeway	N. Brunswick, N. J.	Jan. 27, "
Stoves, anthracite, wrought iron for	Thomas M. Southwick	Troy, Conn.	June 6, "
Stoves, covering the rods used to bind	John C. Parry	Pittsburgh, Pa.	June 12, "
Stoves, and fire places	Daniel Sutherland	Lisbon, Maine	Oct. 31, "
Stoves, furnace	Harvey Hubbard	Berlin, Conn.	Mar. 25, "
Stoves, furnace	James Atwater	New Haven, Conn.	June 20, "
Stoves, and grates	Elkanah Ingalls	Providence, R. I.	Ap'l 22, "
Stoves, heating apartments	Charles W. Peckham	New Haven, Conn.	May 16, "
Stoves, heating irons for tailors' and hatters' use	John Lewis	Derby, Conn.	Aug. 17, "
Stoves, knobs or handles	Jordan L. Mott	New York	July 21, "
Stoves, manufacturing	Elias W. Newton	Middletown, Conn.	Jan. 9, "
Stoves, stone coal	Philip Benedict	Lancaster, Pa.	Oct. 27, "
Warming buildings by radiated and steam heat, &c	Robert Rogers	South Berwick, Me.	June 12, "

CLASS VI.—STEAM AND GAS ENGINES, *including Boilers and Furnaces therefor, and parts thereof.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Boilers, steam	J. F. C. Salmon	Philadelphia, Pa.	Oct. 17, 1835
Boilers, steam	Thomas Ashcroft	Boston, Mass.	Nov. 23, "
Boilers, steam, and furnace for boats	E. Nott	Schenectady, N. Y.	Ap'l 22, "
Boilers, steam, feeding	Hunsicker and Krauss	Northampton, Pa.	Aug. 30, "
Boilers, steam, pipes, &c.	John Goulding	Boston, Mass.	June 19, "
Boilers, steam, regulating height of water in	Jesse Fox	Lowell, Mass.	April 2, "
Boilers, steam, regulating height of water in	Thomas Odiorne	Malden, Mass.	Sep. 26, "
Explosion, steamboats, mills, &c.	George R. Clarke	Rochester, N. Y.	July 7, "
Float, rotary, spiral springs, for steam engines	Mason Young	Buffalo, N. Y.	July 21, "
Gauge, steam, for preventing the explosion of boilers	Samuel Raub, Jr.	Wilkesbarre, Pa.	Dec. 28, "
Heat, economy of, in generating steam	Tunis V. Le Roy	Newport, N. Y.	Aug. 17, "
Pistons, steam engines for	Wright and Ketchum	Calhoun co., M. T.	July 19, "
Spark catcher	Alfred C. Jones	Portsmouth, Va.	Aug. 27, "
Spark catcher	Haut C. Wyatt	Weldon, N. C.	Oct. 15, "
Spark catcher	George Holbrook	Boston, Mass.	Nov. 23, "
Spark catcher	James W. Wapples	Wilmington, Del.	Nov. 30, "
Steam engine	John Murphy	Philadelphia, Pa.	Mar. 24, "
Steam engine	Job Sheldon	New Haven, Conn.	Mar. 24, "
Steam engine	John Bennack	Orono, Maine	Sep. 9, "
Steam engine, centrifugal, pneumatic	Charles C. Conway	New York	Nov. 14, "
Steam engine, locomotive	Charles & George Sellers	Philadelphia, Pa.	May 22, "
Steam engine, locomotive, wheels, and boiler, tubes for	M. W. Baldwin	Philadelphia, Pa.	April 3, "
Steam engine, locomotive, wheels, and boiler, tubes for	M. W. Baldwin	Philadelphia, Pa.	Aug. 17, "
Steam engine, rotary	George M. Allsop	Philadelphia, Pa.	Feb. 20, "
Steam engine, rotary	Orson Barnes	Van Buren, N. Y.	June 26, "
Steam engine, rotary	Arnold Buffum	Philadelphia, Pa.	Oct. 10, "
Steam engine, rotary and boiler	Ethan Baldwin	Washington, D. C.	Jan. 13, "
Steam engine, rotary, rarefied air	George Cameron	Washington, D. C.	Aug. 17, "
Steam engine, rotary, re-acting	Charles Hill	Zanesville, Ohio	June 26, "
Steam engine, rotary, re-acting	J. G. Hotchkiss	New Haven, Conn.	Nov. 7, "
Steam, generating	William Scarbrough	Savannah, Ga.	April 8, "
Steam power	Elisha Bates	Mt. Pleasant, Ohio.	July 27, "
Steam power and boiler	Benjamin Gates	Ontwa t'p, M. T.	Mar. 24, "
Steam wheel	William Wilson	Henderson co. Tenn.	Mar. 13, "
Valve, for boilers and cam	John Kirkpatrick	Baltimore, Md.	May 29, "
Valve, engines	John Kirkpatrick	Baltimore, Md.	May 29, "
Valve, sliding	Andrew M. Eastwick	Philadelphia, Pa.	July 21, "

CLASS VII.—NAVIGATION *and Maritime Implements, comprising all Vessels for conveyance on water, their construction, rigging and propulsion, Diving Dresses, Life Preservers, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Anti-friction wheels, applicable to steamboats	Julian Nicolet	Pittsburgh, Pa.	June 12, 1835
Bending mast and truss hoops	Jonathan Mulford	North. Liberties, Pa.	Jan. 16, "
Block sheaves, friction bushes or boxes for	Lewis Aspinwall	Albany, N. Y.	Apr. 22, "
Boats, canal and rivers	Anthony Plantou	Philadelphia, Pa.	Mar. 18, "
Boats, canal, sheet iron, twin	Luman Parmelee	Poughkeepsie, N. Y.	Nov. 26, "
Boats, canal, transhipment of merchandize	James O'Conner	Philadelphia, Pa.	Oct. 14, "
Boats, fishing	John Donn	Washington, D. C.	Mar. 6, "
Capstans, for ships	Calvin Oaks	Rochester, N. Y.	May 16, "
Constructing ships	Charles Olcott	Medina, Ohio	Aug. 15, "
Disengaging horses in navigating canals	Gotlieb Shultz	Philadelphia, Pa.	Sep. 9, "
Diving dress	John R. Campbell	Boston, Mass	Nov. 30, "
Gum elastic, applying to vessels	George Duncan Cooper	New York,	Jan. 7, "
Harpoon	Dexter H. Chamberlain	Boston, Mass	Aug. 17, "
Mast and truss hoop, bending	Jonathan Mulford	North. Liberties, Pa.	Jan. 16, "
Propelling boats, screw for	Edward P. Fitzpatrick	Mount Morris, N. Y.	Nov. 23, "
Propelling boats, by screw wheel, &c.	John L. Smith	Charleston, S. C.	Sep. 18, "
Propelling paddles for boats	Philip E. Barbour	Loulsville, Ky	Jan. 27, "
Propelling paddle wheels, &c., &c.	Benjamin M. Smith	Rochester, N. Y.	May 22, "
Propelling steamboats, canal	John Elgar	Baltimore, Md.	Nov. 7, "
Propelling steamboats and other vessels	William Scarborough	Savannah, Ga.	April 8, "
Propelling wheels for steamboats	Nehemiah Dodge	New York	Feb. 25, "
Raising vessels, sunken, &c.	W. Atkinson and E. Hale	New York	Dec. 2, "
Steamboat anti-friction wheels	Julian Nicolet	Pittsburgh, Pa.	June 12, "
Steamboat for canals	John Elgar	Baltimore, Md.	Nov. 7, "
Ventilating bellows, for ships, &c.	James Barron	Philadelphia, Pa.	Feb. 20, "

CLASS VIII.—MATHEMATICAL, *Philosophical and Optical Instruments, including Clocks, Chronometers, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Clocks and time pieces	William Pardee	Albany, N. Y.	May 22, 1835
Clocks and time pieces, propelling, by atmospheric air	Andrew Morse, Jr.	Bloomfield, Me.	Sep. 18, "
Compass, mariner's	Jonathan Ball	Buffalo, N. Y.	Mar. 6, "
Compass, surveying, or circumferenter	Samuel R. Miller	Front Royal, Va.	Oct. 22, "
Escapement, for clocks	James Fulton	Shelby county, Ky.	Dec. 30, "
Level pendulum	Asahel Munger	Oberlin, Ohio	Aug. 17, "
Theodolite or compass	James Eames	Newry, Me.	Feb. 11, "
Theodolite	Samuel Stone	Long Green, Balto., Md.	June 6, "

CLASS IX.—CIVIL ENGINEERING *and Architecture, comprising works on Rail and Common Roads, Bridges, Canals, Wharves, Docks, Rivers, Piers, Dams, and other Internal Improvements, Buildings, Roofs, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Boring rocks	Aaron W. Vancleve	Stonington, Conn	Dec. 2, 1835
Bridges	Ithiel Town	New York	April 3, "
Bridges	George Law	Easton, Pa	June 12, "
Bridges	Richard T. L. Witty	Lowell, Mass	Oct. 14, "
Canals, transportation on, and rail roads.*	John Elgar	Baltimore, Md	Nov. 7, "
Canals, locks, gate	David Wilkinson	Cahoes, N. Y	Aug. 17, "
Chains and ropes, used on canals and rail roads	John M. Palisse and Sidney S. Durfee	Hudson, N. Y	Feb. 25, "
Dock, floating, dry	Jonathan Hawes	Cayuga co., N. Y	Ap'l 22, "
Dock, floating, dry	Rufus Porter	Billerica, Mass	Nov. 14, "
Dock, floating, dry	J. R. Campbell and J. S. Withington	Boston, Mass	Nov. 28, "
Doors, &c., closing	Oliver Davidson	Ballston Spa, N. Y.	Mar. 30, "
Excavating and removing earth	Nathan Currier	Methuen, Mass	May 29, "
Marine railway	Washington Van Dusen	Kensington, Philadelphia co., Pa	Ap'l 14, "
Railroad	Elisha Johnson	Rochester, N. Y	Nov. 23, "
Railroad curves, construction of	Roswel Bourne	Lancaster, Mass	Oct. 10, "
Railroad platform, revolving	John Tustin	Philadelphia, Pa	Sep. 9, "
Railroad, preventing, turning	David Evans	Penn township	Nov. 26, "
Railroad, running gear for	George W. Cleveland	Baltimore, Md	Oct. 14, "
Railroad, self-adjusting	W. T. James	New York	Oct. 27, "
Railroad, turning short curves	James Stimpson	Baltimore, Md	Sep. 26, "
Roads, constructing	Thomas Earle	Burlington, N. J	Oct. 14, "
Roads, constructing with cement	Joseph Robey, Jr	Albany, N. Y	Aug. 17, "
Roofs, covering with tin, &c	John Bouis	Baltimore, Md	June 26, "
Roofs, covering with tin, &c	Charles Bonnycastle	Leesburg, Va	Aug. 17, "
Roofs, covering with tin, &c	Phineas Burgess	Brooklyn, N. Y	Oct. 17, "
Stone eradicator	John C. Blanvelt	Newton, Conn	Mar. 2, "
Stumps, extracting	Henry Gordon	Fountain Dale, Pa	Jan. 16, "
Stumps and rock, extracting	Leonard Norcross	Dixfield, Me	June 15, "
Window and door blinds	Sevil Steere	Gloucester, R. I	Mar. 25, "

* Extended, surrendered, and re-issued under the title of "method of attaching sectional boats to each other by means of a rule joint."

CLASS X.—LAND CONVEYANCE, *comprising Carriages, Cars and other Vehicles used on roads and parts thereof.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Axletrees, diminishing friction	Benjamin Hinckley	Fayette, Kennebec county, Maine	Ap'l 14, 1835
Axletrees and wheels	Aaron Hale	Boston, Mass	April 2, "
Brakes, for cars	John K. Smith	Port Clinton, Pa	Dec. 2, "
Car, railroad	John Withers	Bart township, Pa	Mar. 25, "
Car, railroad, easing the shock in stopping	Charles Davenport	Cambridge, Mass	Sep. 9, "
Car, railroad, frame for	Heinrich Bachman	Lancaster, Pa	May 2, "
Car, railroad, turning with facility	Anthony Shermer	Philadelphia, Pa	Sep. 9, "
Car, railroad, and wagon, &c	James Herron	Richmond, Va	Mar. 25, "
Carriages, and machinery, when wheels are used	Williams and King	Hartford, Conn	May 16, "
Carriages, measuring distance	Richardson and Fuller	Brunswick, Maine	May 29, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Carriages, (wheeled) sustaining weight, &c.	Samuel Chapman	Windsor, Mass.	Mar. 2, 1835
Coaches, panels	Eben A. Lester	Boston, Mass.	Mar. 18, "
Springs, carriage	Henry Pace, Sen.	Cincinnati, Ohio	Oct. 14, "
Springs, carriage, gig, &c., connecting	Amos Davis	Easton, Md.	Mar. 18, "
Wheels and axles	Aaron Hale	Boston, Mass.	April 2, "
Wheels, felloes, bending	Edward Reynolds	Haddonfield, N. J.	July 17, "
Wheels, felloes, cutting machine	J. S. Brown and Jacob J. Barker	Philips, Maine	Oct. 14, "
Wheels, felloes, cutting machine	W. Bradley and M. L. Worthley	Philips, Maine	Oct. 14, "
Wheel hubs, box setter for boring in, &c.	Edward Badlam, Jr.	Chester, Vt.	Sep. 18, "
Wheel hubs and rotary bearings, anti-friction boxes	E. Fisk and J. C. Green	Fayette, Maine	Nov. 14, "
Wheels for rail-road cars	John Baker	Lancaster, Pa.	Mar. 20, "
Wheels for rail-road cars, constructing	Arundius Tiers	Kensington, Pa.	Dec. 2, "
Wheels, spokes, cutting tenons on	William Gerrish	Portsmouth, N. H.	July 21, "

CLASS XI.—HYDRAULICS AND PNEUMATICS, *including Water-wheels, Wind-mills, and other implements operated on by Air or Water, or employed in raising and delivering Fluids.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Air, condensed, for propelling boats, cars, &c.	Alexander McGrew	Cincinnati, Ohio	Oct. 27, 1835
Cistern, reservoirs, vats, &c.	Levi Kidder	New York	Nov. 14, "
Cistern, water, &c.	Alfred Palmer	Syracuse, N. Y.	Dec. 15, "
Engine, fire	Thomas Odiorne	Portsmouth, N. H.	Aug. 27, "
Engine, fire, pump for	Henry Gates	Northampton, Mass.	June 12, "
Hydrants	S. T. Walker	Baltimore, Md.	Nov. 26, "
Hydrostatic and pneumatic machine for propelling	Robert Mills and Henry B. Fernald	Washington, D. C. and Portland, Me.	Oct. 10, "
Pumps	Heinrich Bachman	Lancaster, Pa.	April 2, "
Pumps	Amos Miner	Jordan, N. Y.	July 7, "
Pumps	Joseph Redelsperger	Mansfield, N. J.	Oct. 31, "
Pumps, air	Charles Goodyear	Philadelphia, Pa.	Mar. 30, "
Pump, double acting cylinder	Phelps Mix	Germantown, Pa.	Jan. 9, "
Pump, forcing, double	William Douglass	Middletown, Conn.	Aug. 20, "
Pump, rotary	William C. Trowbridge	Southeast, N. Y.	Jan. 27, "
Pump, rotary	Isaac Hall	Poughkeepsie, N. Y.	Ap'l 22, "
Pump, rotary	David M. Walker	Cavendish, Vt.	Aug. 15, "
Pump, rotary	C. Peters and B. Dean	Poughkeepsie, N. Y.	Oct. 31, "
Pump, for ships, &c.	Thomas Odiorne	Portsmouth, N. H.	Aug. 27, "
Raising water to set machinery in motion	David W. Hunt	Newburyport, Mass.	June 12, "
Tide power	Henry B. Fernald	Portland, Maine	Aug. 17, "
Water power, application to mills	Wood and Dart	Fabius, N. Y.	Sep. 9, "
Water wheel	Robert Eastman	Concord, N. H.	Mar. 11, "
Water wheel	Alvin Darling and Barton Darling	Billingham, Mass.	Ap'l 3, "
Water wheel	William Merril	Randolph, Ohio	May 16, "
Water wheel	Isaac Powell	Lawrence, N. Y.	July 17, "
Water wheel, inclined, &c.	Thomas Pierce	Hartwick, N. Y.	May 2, "
Water wheel, re-acting	John B. McCord	Galena, Ill.	May 16, "
Water wheel, tub	Edward Newman	Stilesville, Ind.	Nov. 26, "
Water wheel, undershot	Ebenezer Cochran	Gibson county, Ind.	June 15, "

CLASS XII.—LEVER, SCREW, *and other Mechanical Power as applied to Pressing, Weighing, Raising, and Moving Weights.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Balance	Nereston Griffing	New York	Apr. 8, 1835
Balance, for counters, &c.	Elias Hibbard	Lunenburg, Vt.	Nov. 7, "
Balance, platform	Alexander Bliss	Benson, Vt.	June 12, "
Balance, platform, double lever scale	E. A. and A. Hibbard	Lunenburg, Vt.	May 29, "
Balance, platform, scale for weighing,	Jesse Marden	Baltimore, Md.	Sept. 9, "
Balance, steelyards	Christopher F. Dahl	Pittsburgh, Pa.	Oct. 31, "
Balance, weighing machine	J. G. Rohr, assignee of Baptiste Maag	New York	Apr. 22, "
Lever, crank, weight, balance wheel, combination of	Elias T. Merrill	Parkman, Me.	Apr. 22, "
Lever power, engine and self-regulating combined pendulum	Sidney Woods	Freeport, Me.	Jan. 7, "
Packing flour	John Hinman	Hartley Tp., Pa.	Mar. 2, "
Press, cheese	David Phelps	Bangor, Me.	June 12, "
Press, cheese, self-adjusting	Rufus Porter	Billerica, Mass.	Feb. 6, "
Press, cotton and hay, &c.	Alexander J. Murray	Annapolis, Md.	Jan. 9, "
Press, cotton and hay, &c.	Eleazer Eliason, jr.	Fredericksburg, Va.	Jan. 21, "
Press, cotton and hay, &c.	Samuel T. Baker	West Gorham, Me.	Mar. 20, "
Press, cotton and hay, &c.	E. and L. L. Macomber	Gardiner, Me.	Aug. 15, "
Press, lever	Jonathan Payne	Russellville, Ky.	Sept. 9, "
Press, screw	Thomas Gilpin	Wilmington, Del.	Apr. 3, "
Press, tobacco	Jehu W. Weems	West River, Md.	Dec. 15, "
Press, tobacco flattener	Emanuel Shoavler	Richmond, Va.	Apr. 22, "
Pressing and raising weights, &c.	Alonzo S. Greenville	Cambridgeport, Mass	Dec. 30, "
Windlass, ship's,	Seth Adams	Boston, Mass.	Feb. 6, "

CLASS XIII.—GRINDING MILLS, *and Mill-gearing, containing Grain Mills, Mechanical Movements and Horse-Powers, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Bands, spiral wheel	Samuel S. Walley	Chester, Pa.	Aug. 17, 1835
Cider mill, cast iron	Philip Pryer	Genesee co., N. Y.	May 29, "
Coffee mill, &c.	E. Morse and C. Putnam	Knoxville, Tenn.	Sept. 9, "
Coffee mill and pepper, &c.	David Richmond	McArthurstown, O.	Oct. 14, "
Cooler, flour	Catlin, Hebard & Abell	Pomfret, N. Y.	May 22, "
Cooler, flour, sifter, grain	Armstrong & King	New York	May 9, "
Corn, grinding and cotton seed	James Martin	Petersburgh, Va.	May 16, "
Corn, grinding and crushing	Andrew P. H. Jordon	Madisonville, Tenn.	Oct. 28, "
Corn, grinding and shelling	Geo. M. Weaver	Montgomery co., Pa.	June 12, "
Gearing mills	Claverius Coleman	Barry's Bridge, Va.	Aug. 27, "
Grist mill	H. P. Nuckols and Pouncy Nuckols	Barron county, Ky.	Jan. 21, "
Grist mill	John R. Sleeper	Philadelphia, Pa.	Jan. 27, "
Grist mill	Adna L. Norcross	Hallowell, Me.	Aug. 20, "
Grist mill	Philip Hauser	Cincinnati, Ohio.	Nov. 7, "
Grist mill	Samuel Hyde	Malone, N. Y.	Nov. 26, "
Grist mill	Owen Moses	Malone, Franklin co. N. Y.	Sept. 26, "
Grist mill, and chopping grain	Pierson Cope	Washington t'p, Pa.	Aug. 17, "
Grist mill, constructing	Elisha Holton	Westminster, Vt.	Apr. 3, "
Grist mill, family	Peter M. Wright	New York	Apr. 14, "
Grist mill, and grinding paints, snuff, &c.	William S. Johnson	New York	June 26, "
Grist mill, and grinding paints and plaster	Cephas Manning	Littleton, Mass.	Apr. 2, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Grist mill, and sawing, constructing	Geo. and F. R. Baker	Tuscaloosa, Ala.	July 7, 1835
Grist mill, with small stones	Frederick Smith	Evans, N. Y.	Mar. 18, "
Horse power	Irby Jones	Natchez, Miss.	Jan. 13, "
Horse power	William E. Arnold	Chatham, Conn.	Mar. 13, "
Horse power	C. Custer and Dan Pone-packer	Providence t'p, Pa.	Mar. 30, "
Horse power	Thomas Mitchell	Newburg, N. Y.	July 7, "
Horse power	Benjamin Wales	Hallowell, Me.	Aug. 17, "
Horse power	Moses Davenport	Phillips, Me.	Oct. 10, "
Horse power	Asa Trahern, H. Heberling, Wm. E. Lukens and Jno. Heberling	Harrison co., Ohio	Oct. 28, "
Horse power, endless chain	Webber Furbish	Hallowell, Me.	Apr. 14, "
Horse power, endless leather	Jonathan G. Stanley and James C. Howard	Winthrop, Me.	Jan. 16, "
Horse power, portable	Samuel S. Allen	Saratoga Sp'gs, N.Y.	Apr. 3, "
Horse power, portable	John Brandon	Williamsport, Pa.	Apr. 8, "
Mill metallic file, furrowing, dressing	Samuel G. Reynolds	Providence, R. I.	Mar. 18, "
Mill stones, dressing	David P. Napier	Casey county, Ky.	Sept. 18, "
Pendulum power	Abraham Wade	Eagletown, N. Y.	Mar. 25, "
Power, augmenting, engine	Andrew Ochler	Eastonville, Va.	Mar. 30, "
Power, by weights, &c.	Elisha Turner	North Pownall, Me.	June 12, "
Power, propelling by cams and inclined planes	Philo C. Curtes	Utica, N. Y.	May 29, "
Power, propelling machinery	David Russell	Tuscumbia, Ala.	Oct. 27, "
Power, propelling machinery, called lever and dead weights	Luke M. Edwards	Trenton, Tenn.	Mar. 2, "
Power, propelling mills by weights, &c.	Obed R. Marston	Java, N. Y.	Jan. 9, "
Spindle and bush, ring and ball, for mills	Warren P. Wing	Greenwich, Mass.	Feb. 20, "
Spindle, oil bush	Jesse Hinman	Clinton town'p, Pa.	Mar. 2, "

CLASS XIV.—LUMBER, *including Machines and Tools for Preparing and Manufacturing; such as Sawing, Planing, Mortising, Shingle and Stave, Carpenters' and Coopers' Implements.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Auger	William Jones	Portsmouth, Va.	June 12, 1835
Auger	William Jones	Portsmouth, Va.	June 15, "
Auger, or bit	Ezra L'Hommedieu	Saybrook, Conn.	Feb. 11, "
Auger, for boring large holes	Nicholas J. Lampman	Coxsackie, N. Y.	April 8, "
Auger, and gimlets	Orville Percival	East Haddam, Conn.	Oct. 14, "
Barrels, manufacturer	John Squier	Salina, N. Y.	Jan. 21, "
Bungs, cutting	George D. Gates	Hartford, Conn.	May 2, "
Coopering, working off tool	Melancthon Sutton	Penfield, N. Y.	Sep. 9, "
Grooving plane	James Herman	Lancaster, Ohio	Aug. 27, "
Hoops, and barrels, dressing	Kimball, Perry and Spaulding	Peterborough, N. H.	Sep. 18, "
Hoops, truss, making	Tristram Burgess and Simon Burgess	Livonia, N. Y.	Jan. 21, "
Lathe, cooper's	Isaac Hoover	Miamisburg, Ohio	July 2, "
Lathe, turning irregular forms	Cullen Whipple, J. Sprague and Milton T. Whipple	Douglass, Mass.	April 3, "
Lathe, turning rake handles	James Haven	Newport, N. H.	Oct. 14, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Lathe, turning machine for rake teeth	Giles Dayton and William Stedman	Blanford and Springham, Mass.	Jan. 13, 1835
Laths, cutting	David M. Cradit	Ithica, N. Y.	May 22, "
Laths, splitting and cutting	Barnabus Langdon	Troy, N. Y.	Dec. 15, "
Mortising machine	Grove Bradley	Auburn, N. Y.	Feb. 25, "
Mortising machine	Jonathan Page	Henniker, N. H.	June 12, "
Mortising machine	Israel J. Richardson	Palmyra, N. Y.	July 7, "
Mortising machine	Imla Wright	Centre Antrim, N.H.	July 17, "
Mortising machine	Charles Gates	Centre Antrim, N.H.	Sep. 26, "
Mortising machine	John McBride	Richmond, Ind.	Nov. 26, "
Mortising chisel	Charles Rinehart	Marietta, Lancaster county, Pa.	April 8, "
Mortising chisel	George Page	Keene, N. H.	July 7, "
Mortising and tenoning	Erastus M. Shaw	Brooklyn, N. Y.	April 8, "
Mortising and tenoning	Joseph H. Darby	Leominster, Mass.	June 15, "
Mortising and tenoning sash, doors and blinds	Ira Gay	Dunstable, N. H.	May 29, "
Pegs, shoe, splitting	Mark Wilder	Peterborough, N. H.	Aug. 15, "
Planing machine	Fisher Stedman	Aquackanock, N. J.	Aug. 17, "
Planing machine	Reid R. Throckmorton.	New York	Oct. 6, "
Planing machine	Reid R. Throckmorton.	New York	Oct. 22, "
Planing machine	McLaughlin and Hill	Sunderland, Vt.	Oct. 28, "
Planing machine, (improvement on Woodworth's)	Artemas L. Brooks	Lowell, Mass	Jan. 7, "
Planing window sash	Ira Gay	Dunstable, N. H.	May 29, "
Rules, carpenter's joints	Lemuel Hedge	Brattleborough, Vt.	Ap'l 22, "
Saw, cutting timber	John Ruthven	New York	Nov. 30, "
Saw, for felling trees	James Hamilton	New York	June 26, "
Saw, use of	Aaron Field	Jericho, Vt.	Mar. 6, "
Saw mills	Ernst G. Augustine	New York	July 17, "
Saw mills	Linus Yale	Utica, N. Y.	Sep. 11, "
Saw mills	Uri Emmons	New York	Oct. 6, "
Saw mill carriage,	Henry Gordon	Adams county, Pa.	April 8, "
Saw mill, carriage	Samuel Phelps	Mount Morris, N.Y.	Sep. 18, "
Saw mill, constructing	Nath. & Pearson Crosby	Pomfret, N. Y.	Mar. 27, "
Saw mill, dog gauge	Martin Rich	Caroline, N. Y.	Mar. 27, "
Saw mill, dog block	Benjamin F. Snyder	Painted Post, N. Y.	April 3, "
Saw mill, dog lever	Martin Rich	Caroline, N. Y.	Mar. 25, "
Saw mill, gauge	William A. Needham	Brimfield, Mass.	Sep. 9, "
Saw mill, machinery and wheels	John Muir	Menzllen, Pa.	Sep. 26, "
Saw mill, portable	David Russell	Tuscumbia, Ala.	Oct. 27, "
Saw mill, saw	Levi Fisk	Schroon, N. Y.	Aug. 17, "
Shingles, metallic, for roofs	Chade Southwick and Israel J. Richardson	Palmyra, N. Y.	April 8, "
Shingles, sawing	Daniel B. Moore	Strafford co., N. H.	Aug. 15, "
Shingles and staves, shaving	William W. Wilkinson	Wayne, Ohio	Sep. 26, "
Staves, cutting, from steam timber.	George Pack	Sullivan, N. Y.	Oct. 10, "
Staves, dressing	Joseph Sweet	Boro' of Muncey, Pa.	Oct. 28, "
Staves and shingles, heading of barrels	John Everheart, Jacob Pearson, John Morford and Nathan Everheart	Wayne, Ohio	Oct. 6, "
Staves, saw	Harvey Holmes	N. Marlboro', Mass.	Jan. 21, "
Staves, saw	Hart Pepper	Southwick, Mass.	Feb. 5, "
Staves and shingles, shaving and heading	John Everheart	Waynesville, Ohio.	June 12, "

CLASS XV.—STONE AND CLAY MANUFACTURES, *including Machines for Pottery, Glass making, Brick making, Dressing and Preparing Stone, Cements, and other Building Materials.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Brick machine	J. M. Bannister	Phelps, N. Y.	June 19, 1835
Brick machine	George W. Gilbert	Pittsburgh, Pa.	Aug. 15, "
Brick press	Nathan Sawyer	Mount Vernon, Ohio	April 8, "
Brick press	William Wadsworth	Hartford, Conn.	June 26, "
Brick press	Nathan Reed	Belfast, Me.	Aug. 20, "
Brick press and delivering	Ulysses Ward	Washington, D. C.	Dec. 15, "
Brick, shape of, for roofs	James Parker	Gardiner, Me.	Aug. 15, "
Brick, striker	Peleg Sweet	Ashtabula, Ohio	Feb. 20, "
Brick and tile	Benton P. Coston	Sterling, Pa.	Oct. 22, "
Brick, &c., and tile	Benjamin Hamblet	Portland, Me.	Dec. 28, "
Clay, potters, purifying	Adam Weber	Womelsdorf, Pa.	Sep. 9, "
Glass and stone, grinding, &c.	Peter Cooper	New York	Mar. 24, "
Mortar, machine, and mason's tender	Samuel Whitman	Danville, Ill.	Mar. 11, "
Mortar, mixing, &c.	Swimley and Everhart	Washington, D. C.	June 20, "
Mortar, mixing, and hoisting brick	Jesse Rinehart	Danville, Ill.	June 6, "
Stone, sawing	Joseph F. Duller	Philadelphia, Pa.	May 22, "
Stone, saw-mill	Daniel Bunnel	Xenia, Ohio	Oct. 27, "

CLASS XVI.—LEATHER, *including Tanning and Dressing, Manufacture of Boots, Shoes, Saddlery, Harness, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Boarding machine, for softening hides	Eli Kendall	Ashby, Mass.	June 19, 1835
Boots, bootees, &c., cutting the uppers	Joseph T. Buck	New Canaan, Conn.	Oct. 27, "
Boots, machine for blacking and cleaning	John Folsom	Hallowell, Me.	Ap'l 14, "
Boots, machine for turning boot legs	S. C. Blodget and Henry Boynton	Rowley, Mass.	Sep. 26, "
Boots, manufacturing by the hinge or boot cramp	Nathan Ayer	St. Johnsbury, Vt.	June 19, "
Boots and shoes, water proof	David Clarkson	New York	Dec. 2, "
Currier's knife and double trimmer	Luther Townsend	Farmington, Me.	Jan. 16, "
Finishing leather	Cushman Bassett	Boston, Mass.	Mar. 25, "
Harness, collars, blocking and stretching	Melvin Eddy	Adams, N. Y.	Ap'l 22, "
Harness, hames, fastening, horse	Timothy Taylor	Loudoun co., Va.	Mar. 11, "
Harness, hames, wood, supersede collars	Sereno Norton	E. Bloomfield, N. Y.	June 12, "
Harness, horse collars	Caleb Angevine	New York	Oct. 27, "
Harness, horse collars	Henry C. Call	Sterling, Conn.	Nov. 14, "
Harness, horse collars, cutting tops of	Timothy Deming	East Hartford, Conn.	Mar. 6, "
Saddles, riding, of gum elastic webbing	A. L. Vanhorn	Philadelphia, Pa.	June 26, "
Saddles, seat, spring	Marshall Bayliss and W. Brannon	Fredericksburg, Va.	May 16, "
Saddles, spring	Joel Woodward	Marshalltown, Pa.	Oct. 6, "
Saddles, spring	Adam Hickman	Abingdon, Va.	Nov. 23, "
Saddles, spring	Charles Bates	Staunton, Va.	Nov. 26, "
Saddles, spring seat, riding	J. G. Palmer, Harvey and Anthony Beard	Greenville, Va.	June 12, "
Saddles, trees, ladies	John M. Bouton	Newark, N. J.	Aug. 11, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Shoes, water proof	Ernst G. Augustin	New York	July 6, 1835
Splitting leather and paring	Herrick Aiken	Middlesex, Mass.	June 12, "
Tanning hides	Jno. Lippincott and Jno. Hillyear	Philadelphia, Pa.	Ap'l 14, "
Tanning, improvement in	Isaac M. Belote	Fayette co., Tenn.	Ap'l 14, "
Tanning, preparing extract of bark for	Otis Batchelder	Bedford, N. H.	Nov. 7, "
Tanning, preparing skins	J. C. F. Salomon	Reading, Pa.	Oct. 17, "
Tan-vats, reservoirs, constructing with cement	John C. Johnson	Catskill, N. Y.	Feb. 20, "
Trunks and settee	Benjamin Morris	New Richmond, O.	Jan. 16, "

CLASS XVII.—HOUSEHOLD FURNITURE, *Machines and Implements for Domestic Purposes, including Washing Machines, Bread and Cracker Machines, Feather Dressing, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Beds, palm leaf	Josiah C. Smith	Cambridgeport, N.Y.	Apr. 3, 1835
Beds, spring, spiral conical	W. J. and A. E. Lyman	East Hampton, Mass.	Sept. 18, "
Bedsteads	B. F. Berry	Utica, N. Y.	Apr. 22, "
Bedsteads	Perry Prettyman	Georgetown, Del.	Sept. 26, "
Bedstead machine	Aaron Stedman	Pittsford, N. Y.	Jan. 16, "
Bedstead and mattress	Edmund Cherington	Boston, Mass.	Nov. 23, "
Bedstead, for the sick	Nathaniel Richardson	Boston, Mass.	Sept. 9, "
Brush, art of making	William Steele	New York	Aug. 17, "
Chairs	Eli F. Benjamin	Utica, N. Y.	Aug. 17, "
Cheese, machine for turning and curing	Henry Webber	East Richfield, N. Y.	Apr. 22, "
Crackers, cutting	Thomas and Thomas H. Havener	Washington, D. C.	Oct. 17, "
Crackers, cutting	W. R. Nevins	New York	Oct. 17, "
Crackers, cutting	Levin P. Clark	Baltimore, Md.	Nov. 7, "
Cutting meat	John Morris	Derby, Conn.	Feb. 25, "
Cutting sausage meat	Peter Fahnestock and J. Monn, Jr.	Quincy, Pa	Mar. 11, "
Cutting sausage meat	A. and J. Keagy	Morrison Cove, Pa.	June 15, "
Cutting sausage meat	James Burns and Jno. Walter	Waynesborough, Pa.	Jan. 16, "
Cutting vegetables	Jonathan Clark	Hampton, Conn.	July 7, "
Feathers, dressing and cleaning	Orestes Badger	Otsego, N. Y.	Apr. 22, "
Feathers, cleaning and purifying	George Reynolds	East Hartford, Conn.	Sept. 11, "
Feathers, dressing and purifying	Bartholomew Smith	Schodiack, N. Y.	Nov. 23, "
Grater	E. B. Strong	Buffalo, N. Y.	Aug. 27, "
Ironing clothes	Samuel Swett, Jr.	Readfield, Me.	Dec. 30, "
Refrigerator	John Waring	Port Tabago, Va.	June 12, "
Sofa, chairs, &c., springs for	Edward Cherrington	Boston, Mass.	Nov. 23, "
Washing machine	Stillman Roberts	Portland, Me.	Jan. 16, "
Washing machine	Amos C. Haniford	Northfield, N. H.	Feb. 6, "
Washing machine	Stephen A. McGeorge	Alexander, N. Y.	Mar. 24, "
Washing machine	Ezra Whitman, Jr., (assignee of Ezra Whitman)	Winthrop, Me.	Mar. 27, "
Washing machine	John Snyder, Jr.	New York	May 2, "
Washing machine	Philo Hunt	Litchfield, Conn.	May 2, "
Washing machine	Jacob Sager	Harrisonburg, Va.	May 9, "
Washing machine	John T. Denniston	Alexander, N. Y.	May 22, "
Washing machine	A. W. Soull	Portland, Me.	July 18, "
Washing machine	David Warren	Winthrop, Me.	Aug. 27, "
Washing machine	Wm. and J. D. Collins	Norwich, Conn.	Aug. 27, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Washing machine	James Lombard	Readfield, Me.	Sept. 9, 1835
Washing machine	J. J. and E. C. Milliken.	Winthrop, Me.	Sept. 26, "
Washing machine	John O. Geer	Norwich, Conn	Oct. 10, "
Washing machine	Henry Ault	Philadelphia, Pa.	Oct. 14, "
Washing machine	Isaac Spicer	Norwich, Conn	Oct. 17, "
Washing machine and churn	Mitchell & Fairbanks	Readfield, Me.	May 9, "
Washing machine and fulling	Orin D. Wade	China, N. Y.	Sept. 9, "
Water closet, portable	James Stone	New York	Mar. 11, "
Window shades, &c., rolling up	Henry Lamson	Boston, Mass.	July 17, "

CLASS XVIII.—ARTS, POLITE, FINE AND ORNAMENTAL, *including Music, Painting, Sculpture, Engraving, Books, Paper, Printing, Binding, Jewellery, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Bills of credit	John Golder	Philadelphia, Pa.	Sep. 26, 1835
Bills of exchange	Charles C. Wright	New York	June 19, "
Brushes, for blending colors, &c.	George M. Morris	Philadelphia, Pa.	Mar. 6, "
Cutting press, for paper	Benjamin Morris	Oxford, N. Y.	Feb. 15, "
Ink, distributer, self-operating	John Maxson	Schenectady, N. Y.	Jan. 9, "
Inking machine, for inking types	Sam'l Fairlamb and Jno. Gilpin	New York	Mar. 27, "
Pen, metallic	Pregrine Williamson	New York	Mar. 30, "
Pencil, everpointed lead	Elwood Meeds	Philadelphia, Pa.	June 26, "
Pencil points, making and composition	Guy C. Baldwin	Ticonderoga, N. Y.	Dec. 2, "
Piano, compensating tubes	Thomas Loud	Philadelphia, Pa.	July 7, "
Printing apparatus	Joseph Warren	Warwick t'p, Ohio.	May 2, "
Printing press	J. Lemuel Kingsley	New York	Ap'l 22, "
Printing press, register for Napier	M. Caton and J. C. Rives	Washington, D. C.	Mar. 11, "
Ruling machine for paper	James C. Teasdale	Dansville, N. Y.	June 15, "
Stamps, for post and other offices	Benjamin Chambers	Washington, D. C.	Sep. 9, "

CLASS XIX.—FIRE ARMS AND IMPLEMENTS OF WAR, AND PARTS THEREOF, *including the Manufacture of Shot and Gunpowder.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Cartouch box	Robert Dingee	New York	Aug. 15, 1835
Fire arms, overlaying with tin, &c.	Samuel Ladd	Waltham, Mass.	Oct. 14, "
Lock, percussion, cannon	Robert Beale	Washington, D. C.	Jan. 13, "
Lock, percussion, gun	Robert Beale	Washington, D. C.	Feb. 20, "
Lock, percussion, gun	Thomas Daplyn	Dover, Ohio	Feb. 20, "
Pistols, pocket	Victor M. Wallace	West Topham, Vt.	Aug. 17, "

CLASS XX.—SURGICAL AND MEDICAL INSTRUMENTS, *including Trusses, Dental Instruments, Bathing Apparatus, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Bath, vapor	P. P. N. D'Alvigny	Leonard st., N. Y.	Aug. 17, 1835
Bleeding horses, &c., instrument for	Cornelius Addle	Winthrop, Me.	May 9, "
Corns, eradicating, &c	William Davis	Williamsburg, Va.	Sep. 9, "
Nipple shield	William Baxton	Woburn, Mass.	Ap'l 2, "
Truss, common convex	Philip Hittel	Philadelphia, Pa.	May 2, "
Truss, gum elastic, hernia	Vernum Wilkinson	New York	Nov. 14, "
Truss, gum elastic, hernia	Robert Semple	Vidalia, La.	Nov. 14, "
Truss, for hernia	John W. Wood	Clark county, Ky.	Ap'l 2, "
Truss, for hernia	Benjamin M. Smith	Lumpkin co., Ga.	Ap'l 14, "
Truss, for hernia	John J. Heintzelman	Philadelphia, Pa.	June 6, "
Truss, relaxation of the vagina	John F. Gray (Administrator of A. G. Hull)	New York	Dec. 9, "
Truss, spring	Henry Reid	Augusta, Ga.	Oct. 31, "

CLASS XXI.—WEARING APPAREL, *Articles for the Toilet, &c., including Instruments for Manufacturing.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Brush, hair	Joseph B. Burgess	New York	Ap'l 14, 1835
Combs, for the hair	George Hooker	Bristol, Conn.	April 3, "
Combs, metallic	Nath'l. Bushnell	Middletown, Conn.	Oct. 31, "
Combs, teeth, cutting of	Lemuel Adams	Redding, Conn.	May 2, "
Garments, measuring for	John S. Rockafellow	Flemington, N. J.	Sep. 18, "
Garments, measuring and marking out coats	Allen Ward	Philadelphia, Pa.	Jan. 7, "
Garments, tailor's measure for laying out	Frederick A. Fairchild	Columbus, Ga.	Oct. 31, "
Razor, sharpening, application of adhesive slate	William Child	Baltimore, Md.	Dec. 15, "
Shears, tailor's	John Andrews, assignee of Rochius Heenisch	New York	Mar. 11, "
Stock for the neck	Thomas Goodrum	New York	Aug. 27, "

CLASS XXII.—MISCELLANEOUS.

INVENTIONS OR DISCOVERIES	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Caoutchouc, cutting into shreds	William Atkinson	New York	Oct. 6, 1835
Coffins, of artificial stone or marble	John White	New York	July 18, "
Coffins, from hydraulic cement	Dayton, Hoyt and White	Salina, N. Y.	June 6, "
Coffins, from hydraulic cement	John White	New York	July 18, "
Scalding hogs by steam	Thomas J. Goodman	Baltimore, Md.	Feb. 13, "
Tobacco, manufacturing chewing, (called Roanoke leaf)	E. W. D. Chassaing	Baltimore, Md.	Mar. 24, "

[G.]

ALPHABETICAL LIST

ONS WHOSE PATENTS HAVE EXPIRED DURING THE YEAR 1849, WITH THEIR INVENTIONS OR DISCOVERIES AND CLASS.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
rew	Cooking stove	V.
ac	Hulling coffee berry	I.
	Windlass, ship's	XII.
elius	Bleeding horses and instruments for	XX.
nuel	Combs, teeth, cutting of	XXI.
rick	Saw set	II.
rick	Splitting leather, &c.	XVI.
el S	Thrashing machine	I.
. M.	Steam engine, rotary	VI.
el S	Horse power, portable	XIII.
	Paper machine	III.
aleb	Churn	I.
aleb	Harness horse collars	XVI.
o., assignee of Rochius Heiniseh	Shears, tailors'	XXI.
nd King	Cooler, flour sifter, &c.	XIII.
lliam E	Horse power	XIII.
. and J. Peck	Cutting grain, &c.	I.
homas	Boilers, steam	VI.
Lewis	Block sheaves, &c.	VII.
William	Caoutchouc spreading, &c.	IV.
mes	Stove furnace	V.
m. and E. Hale	Raising vessels	VII.
William	Caoutchouc, cutting into shreads	XXII.
rnst G	Straw cutter	I.
rnst G	Cooking stove and warming rooms	V.
rnst G	Saw mills	XIV.
rnst G	Shoes, water-proof	XVI.
	Washing machine	XVII.
an	Boot manufacturing, &c.	XVI.
hel	Churn, propelling by weights	I.
ward, Jr	Cutting, cradle for grain	I.
an	Plough	I.
, G. Hill and S. B. Hawkins	Brand	II.
V. and R. Walker	Forge hearth, &c.	II.
V	Furnace, hot air and cupola	II.
uy C	Composition pencil points	IV.
nd W. C	Boiler, kitchen	V.
en, and Elijah Harris	Fire place and chimney	V.
cob	Ovens, baking, &c.	V.
. W	Steam engine, locomotive, &c., tubes for	VI.
. W	Steam engine, locomotive, &c., tubes for	VI.
on	Steam engine, rotary	VI.
han	Steam engine, rotary and boiler	VI.
a	Steam power	VI.
hilip E	Propelling paddles for boats	VII.
nes	Ventilating bellows for ships	VII.
an	Compass, mariners'	VIII.
Heinrick	Car, railroad frame for	X.
lward, Jr	Wheel, hubs, box setter, &c.	X.
n	Wheels for railroad cars	X.
Heinrick	Pumps	XI.
uel T	Press, cotton and hay	XII.
rge and F. R	Grist mill, and sawing, &c.	XIII.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
Bannister, J. M.	Brick machine.	XV.
Basset, Cushman	Finishing leather	XVI.
Bayliss and Brannon	Saddles, seat, spring	XVI.
Bates, Charles	Saddles, spring	XVI.
Batchelder, Otis	Tanning, preparing extract of bark for	XVI
Badger, Orestes	Feathers, dressing and cleansing	XVII.
Baldwin, Guy C.	Pencil points, making, &c.	XVIII.
Baxton, William	Nipple shield	XX.
Beam, Michael	Seeding, cotton planter	I.
Belden, Allen	Fur, substitute for, &c.	III.
Bernard, Robert S.	Composition, for medical purposes	IV.
Benedict, Philip	Stoves, stone coal	V.
Bennack, John	Steam engine	VI.
Belote, Isaac M.	Tanning, improvement in	XVI.
Berry, B. F.	Bedsteads	XVII.
Benjamin, Eli F.	Chairs	XVII.
Beale, Robert	Locks, percussion cannon	XIX.
Beale, Robert	Locks, percussion gun	XIX.
Bigelow and Brigham	Awls, drills, &c., setting	II.
Bingham, Albert	Latch, &c., for doors	II.
Bliss, Zenas	Cloth dressing, &c.	III.
Blynn, Henry	Hats, bodies, stiffening	III.
Blanvelt, John C.	Stone eradicator	IX.
Bliss, Alexander	Balance platform	XII.
Blodget and Boynton	Boots, machine for turning, &c	XVI.
Bosworth, Nathaniel	Gold, extracting, from ore, &c	II.
Boden, Frederick N	Vinegar, mode of making	IV.
Bourne, Roswell	Railroad curves, construction of	IX.
Bonnycastle, Charles	Roofs, covering with tin, &c.	IX.
Bouis, John	Roofs, covering with tin, &c.	IX.
Bouton, John M.	Saddles, trees, ladies	XVI.
Brewster, Iram	Churn	I.
Bradley, Russel	Churn	I.
Brewster, Frederick	Plough, polyshare	I.
Briggs, Noah	Rake, horse	I.
Bradley, Russel	Thrashing machine, &c.	I.
Brown, Truman B.	Winnowing machine	I.
Brown, Edward	Locking number of drawers	II.
Brundred, Benjamin	Blower, spiral cone	V.
Brown and Barker	Wheels, felloes, cutting machine	X.
Bradley and Worthley	Wheels, felloes, cutting machine	X.
Brandon, John	Horse power, portable	XIII.
Bradley, Grove	Mortising machine	XIV.
Brooks, Artemas L.	Planing machine	XIV.
Burrall, Thomas D.	Seeding, corn planter	I.
Burrall, Thomas D.	Thrashing machine	I.
Burgess and Baldwin	Thrashing machine, clover, &c.	I.
Burden, Henry	Shoes, horse	II.
Burr, Oliver C.	Loom	III.
Burch, John	Cooking, applying the, &c.	V.
Burrall, Thomas D.	Cooking stove	V.
Burch, John	Cooking stove, reflection of, &c	V.
Bulkley, M. Brook	Furnaces for anthracite	V.
Buffum, Arnold	Steam engine, rotary	VI.
Burgess, Phineas	Roofs, covering with tin, &c.	IX.
Burgess, Tristam and Simon	Hoops, truss making	XIV.
Bunnell, Daniel	Stone saw-mill	XV.
Buck, Joseph T.	Boots, &c., cutting the uppers	XVI.
Burnes and Walter	Cutting sausage meat	XVII.
Burgess, Joseph B.	Brush, hair	XII.
Bushnell, Nathaniel	Combs, metallic	XII.
Card, John	Smut machine	I.
Carman, Luther	Thrashing machine	I.
Campbell, J. R. and H. C.	Lock, door, and other fastenings	II.
Caldwell, Andrew	Spinning, hemp and flax	III.
Calvert, William W	Wool or flax, to brush into teeth	III.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
George	Steam engine, rotary, &c.	VI.
, John R.	Diving dress	VII.
and Withington	Dock, floating, dry	IX
ebard and Abell	Cooler, flour	XIII.
ry C.	Harness, horse collars	XVI.
Rives	Printing press, register, &c.	XVIII.
John P.	Cutting grass	I.
, Stephen	Nails, machine, nippers for Reed's	II.
r, A. and S.	Hat blocks	III.
ain, Dexter H.	Harpoon	VII.
, Samuel	Carriages, wheeled, &c.	X.
on, Edmund	Bedstead and mattrass	XVII.
on, Edward	Sofa, and springs for	XVII.
, Benjamin	Stamps, for post and other offices	XVIII.
lliam	Razor, sharpening, &c.	XXI.
, Edward	Tobacco, manufacturing, &c.	XXII.
muel	Churn	I.
nuel	Plough	I.
harles	Cement for blocks, &c.	IV.
orge R.	Explosion, steamboats, &c.	VI.
, George W.	Railroad, running gear for	IX.
David	Boots and shoes, water proof	XVI.
vin P.	Crackers, cutting	XVII.
nathan	Cutting vegetables	XVII.
rancis	Churn	I.
n W.	Straw cutter	I.
John	Door, wire springs for	II.
ohn C.	Forges and bellows for blacksmiths, &c.	II.
m. S.	Gin cotton, boxing for	III.
Samuel, Jr.	Wool, combing	III.
dward C.	Salts, manufacturing, &c.	IV.
harles C.	Steam engine, centrifugal, &c.	VI.
eorge Duncan	Gum elastic, applying to vessels	VII.
Ebenezer	Water wheel, undershot	XI.
Claverius	Gearing mills	XIII.
rson	Grist mill, &c.	XIII.
enton P.	Brick and tile	XV.
eter	Glass and stone grinding	XV.
Vm. and J. D.	Washing machine	XVII.
avid M.	Lathe, cutting	XIV.
homas	Kiln for drying grain	V.
. and P.	Saw mill, constructing	XIV.
seph	Gold, amalgam, mill for, &c.	II.
seph	Gold, amalgam, mill for, &c.	II.
seph	Gold, amalgam, mill for, &c.	II.
Nathan	Excavating and removing earth	IX.
Ponepacker	Horse power	XIII.
ilo C.	Power, propelling by cams, &c.	XIII.
vid	Cultivator	I.
t, Moses	Thrashing machine, &c.	I.
Reuben	Napping cloth	III.
my G.	Spinning spindle, dead	III.
ekiel	Cooking stove	V.
Oliver	Doors, &c., and closing	IX.
t, Charles	Car, railroad, &c.	X.
es	Springs, carriages, &c.	X.
. and B.	Water wheel	XI.
istopher F.	Balance steel-yards	XII.
t, Moses	Horse power	XIII.
Stedman	Lathe, &c.	XIV.
seph H.	Mortising and tenoning	XIV.
Thomas	Lock, percussion	XIX.
illiam	Corns, eradicating, &c.	XX.
loyt & White	Coffins from cement	XXII.
, P. P. N.	Bath, vapor	XX.
John	Straw cutter	I.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
Denson, William	Straw cutting and corn sheller	I.
Deming, Timothy	Harness, horse collars, &c.	XVI.
Denniston, John T.	Washing machine	XVII.
Dick, Jesse S.	Thrashing, hulling and shelling, &c.	I.
Dickinson, Solomon	Cooking stove	V.
Dinge, Robert	Cartouch box	XIX.
Ditson, Thomas	Hulling coffee-berry	I.
Douglass, Joshua	Cooking stove and fire-place	V.
Donn, John	Boats, fishing	VII.
Dodge, Nehemiah	Propelling wheels, &c.	VII.
Douglass, William	Pump, forcing double	XI.
Dunbar & Powers	Corn sheller	I.
Duncan, William	Dyeing and printing woollen cloths	IV.
Duncan, Charles	Sugar moulds for loaf	IV.
Duller, Joseph L.	Stone sawing	XV.
Eastwick, Andrew M.	Valve, sliding	VI.
Eames, James	Theodolite, or compass	VIII.
Earle, Thomas	Roads, constructing	IX.
Eastman, Robert	Water wheel	XI.
Edgar, H. and J. W.	Thrashing machine, portable	I.
Edwards, Luke M.	Power propelling machinery, called lever and dead weights	XIII.
Eddy, Melvin	Harness collars, blocking and stretching	XVI.
Ellis, William	Washing potatoes and roots	I.
Elgar, John	Steamboat for canals	VII.
Elgar, John	Canals, transportation on, and rail roads	IX.
Eliason, Eleazer, Jr.	Press, cotton and hay, &c.	XII.
Emmons, Uri	Saw mills	XIV.
Evans, David	Railroad, preventing, turning	IX.
Everhart, J., J. Pearson, J. Morford, and N. Everhart	Staves and shingles, heading of barrels	XIV
Everhart, John	Staves and shingles, shaving and heading	XIV.
Fales, James	Cordage, rope serving	III.
Farnham, Calvin H.	Bleaching cloth and cleaning	IV.
Fairbanks, Thaddeus	Cooking stove	V.
Fairman, Legrand	Cooking stove	V.
Fahnestock & Monn	Cutting sausage meat	XVII.
Fairlamb & Gilpin	Inking machine, &c.	XVIII.
Fairchild, F. A.	Garments, tailors' measure, &c.	XXI.
Ferris, Peter	White and whiting, Paris	IV.
Fernald, Henry B.	Tide power	XI.
Fitzpatrick, Edward P.	Smut machine	I.
Fitzpatrick, Edward P.	Winnowing machine	I.
Field, William	Spinning speeder, double	III.
Fitzpatrick, Edward P.	Propelling boats, screw for	VII.
Fisk & Green	Wheel hubs and rotary bearings, anti-friction boxes	X.
Field, Aaron	Saw, use of	XIV.
Fisk, Levi	Saw mill saw	XIV.
Fossard, Felix	Dyeing with alkaline prussiates	IV.
Fox, Jesse	Boilers, steam, regulating height of water in	VI.
Folsom, John	Boots, machine for blacking and cleaning	XVI.
Fulton, James	Escapement for clocks	VIII.
Furbish, Webber	Horse power, endless chain	XIII.
Gatling, Gordon	Cotton thinner	I.
Gatling, Gordon	Seeding, cotton planter	I.
Gavit, William G.	Loom, power	III.
Gay, Gamaliel	Loom, power, for silk	III.
Gay, Gamaliel	Silk, unwinding	III.
Garfield, Lyman	Composition, water-proof, for roofs	IV
Gates, Wm.	Japan, applied to leather	IV.
Gates, Benjamin	Steam power and boiler	VI.
Gates, Henry	Engine, fire pump for	XI.
Gates, George D.	Bungs, cutting	XIV.
Gates, Charles	Mortising machine	XIV.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
Gay, Ira	Mortising and tenoning sash doors and blinds	XIV.
Gay, Ira	Planing window sash	XIV.
Gearheart, John	Thrashing grain, &c	I.
Gerrish, Ansel	Fire place and chimney funneled	V.
Gerrish, Wm	Wheels, spokes, cutting tenons in	X.
Geer, John O	Washing machine	XVII.
Ghormley, David	Plough	I.
Gilbert, Ezra B	Charcoal burner, conical arch	V.
Gill, Bennington	Cooking stove	V.
Gilpin, Thomas	Press screw	XII.
Gilbert, Geo. W	Brick machine	XV.
Goodman, Robert T	Seeding, cotton planter	I.
Gould, Samuel	Thrashing and hulling grass seed	I.
Goulding and Bracket	Cloth, winding up	III.
Goulding, John	Cordage, rope laying	III.
Goulding, John	Flax and hemp, preparing, &c	III.
Goulding, John	Flax and hemp, and tow hatcheling	III.
Goodell and Harvey	Loom power, weaving stock frames	III.
Goodyear, Charles	Cement, gum elastic	IV.
Gore, Ezekiel, Jr	Cooking stove	V.
Goulding, John	Boilers, steam pipes, &c	VI.
Gordon, Henry	Stumps, extracting	IX.
Gordon, Henry	Saw-mill carriage	XIV.
Goodyear, Charles	Pumps, air	XI.
Golder, John	Bills of credit	XVIII.
Goodrum, Thomas	Stock for neck	XXI.
Goodman, Thomas J	Scalding hogs by steam	XXII.
Groves, Wm	Bee house	I.
Gray, Robert	Corn sheller and cleaner	I.
Gray, Guy	Plough, breaking and cultivating, &c	I
Gray, Wm. Waller	Ointment, cure of diseases	IV.
Greeley, Ebenezer S	Fire-place	V.
Griffing, Nereston	Balance	XII.
Greenville, Alonzo S	Pressing and raising weights, &c	XII.
Gray, J. F., administrator of A. G. Hull	Truss, rupture	XX.
Harris, Jas. S	Corn sheller	I.
Harmony, John	Granaries, wheat, &c	I.
Hatch, Julius	Lime, &c., spreading	I.
Hatch, Julius	Lime, &c., sowing	I.
Hall, Ashman	Straw cutting	I.
Hale, Luke	Thrashing machine	I.
Hamilton, James	Trees, &c., mode of felling	I.
Harley, James	Castings, chilled cylinders and cones	II.
Hathaway, Nathan	Composition to prevent absorption of animal and fish oils	IV.
Harrington, Daniel	Galvanic electricity, applied to the surface of the human body	IV.
Harrington, Daniel	Galvanic electricity, to cure diseases	IV.
Hartstuff and French	Potash, manufacturing	IV.
Haws, Jonathan	Dock, floating, dry	IX.
Hale, Aaron	Axletrees and wheels	X.
Hale, Aaron	Wheels and axles	X.
Hall, Isaac	Pump, rotary	XI.
Hauser, Philip	Grist mill	XIII.
Haven, James	Lathe, turning rake handles	XIV.
Hamilton, James	Saw for felling trees	XIV.
Hamblet, Benjamin	Brick, &c. and tile	XV.
Havener, T. and T. H.	Crackers, cutting	XVII.
Haniford, Amos C	Washing machine	XVII.
Herrick, Wm. A	Churn	I.
Hess, William	Plough	I.
Heberling, Henry	Thrashing machine	I.
Herron, James	Car, railroad and wagon, &c	X.
Herman, James	Grooving plane	XIV.
Hedge, Lemuel	Rules, carpenters' joints	XIV.
Heintzleman, John J	Truss for hernia	XX.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
Hinkson, Lewis	Churn, spiral spring	I.
Hinman, Isaac	Hoes, manufacturing	II.
Hinman, Isaac	Rolling metals	II.
Hill, Charles	Steam engine, rotary re-acting	VI.
Hinkley, Benjamin	Axletrees, diminishing friction	X.
Hibbard, Elias	Balance for counters, &c.	XII.
Hibbard, E. A. and A.	Balance, platform, double lever scale	XII.
Hinman, John	Packing flour	XII.
Hinman, Jesse	Spindle, oil bush	XIII.
Hickman, Adam	Saddles, spring	XVI.
Hittel, Philip	Truss, common convex	XX.
Holt, William	Ploughshare, coulter and mould board	I.
Hoth, Hiram	Winnowing cloverseed	I.
Hotchkiss, J. G.	Locks, mortise and latch	II.
Howard, John C.	Fire place, cooking and baking	V.
Holbrook, George	Spark catcher	VI.
Hotchkiss, J. G.	Steam engine, rotary, re-acting	VI.
Holton, Elisha	Gristmill, constructing	XIII.
Hoover, Isaac	Lathe, coopers'	XIV.
Holmes, Harvey	Staves, saw	XIV.
Hooker, George	Combs for the hair	XXI.
Hurst, Abraham	Smut machine, and garlic	I.
Hubbell, Jonathan S.	Coal anthracite, cracking	V.
Hubbard, Harvey	Stoves, furnace	V.
Hunsicker and Krauss	Boilers, steam feeding	VI.
Hunt, David W.	Raising water to set machinery in motion	XI.
Hunt, Philo	Washing machine	XVII.
Hyde, Samuel	Grist mill	XIII.
Igget, John	Cooking stove, portable	V.
Ingalls, Elkanah	Grates and stoves, parlor and kitchen	V.
Ingalls, Elkanah	Stoves and grates	V.
Jackson, Potter and Miller	Spinning spindle, rotary and stationary	III.
Janeway, Jacob J.	Stoves, anthracite coal	V.
James, W. T.	Railroad, self-adjusting	IX.
Jennings, Josiah	Distilling spirits turpentine	IV.
Johnson, Benjamin	Plough, cary bull	I.
Jordan, John W.	Plough, hill side, inverting, &c.	I.
Jones, Henry C.	Straw, cutting cabbage, &c.	I.
Johnson, William G.	Thrashing machine	I.
Johnson, Henry	Thrashing machine	I.
Jones, James	Spinning, roping & doubling cotton, silk, &c.	III.
Jordan, Andrew P. H.	Corn grinding and crushing	XIII.
Johnson, William S.	Grist mill and paints, snuff, &c.	XIII.
Jones, Irby	Horse power	XIII.
Jones, William	Auger	XIV
Jones, William	Auger	XIV.
Johnson, John C.	Tan vats, reservoirs, constructing with cement	XVI.
Jones, Alfred C.	Spark catcher	VI.
Johnson, Elisha	Railroad	IX.
Kellog, Sirah	Hulling cotton seed and rice	I.
Kent, Edward N.	Cooking stove	V.
Kendall, Eli	Boarding machine for softening hides	XVI.
Keagy, A. and I.	Cutting sausage meat	XVII
Kile, Conrad	Loom, weaving stocks	III.
Kimball and White	Mead composition	IV.
Kirkpatrick, John	Valve for boilers	VI.
Kirkpatrick, John	Valve engines	VI.
Kidder, Levi	Cistern reservoirs, vats, &c.	XI.
Kimball, Perry and Spalding	Hoops and barrels, dressing	XIV.
Kingsley, J. Lemuel	Printing press	XVIII.
Knight, Michael	Churn	I.
Knickerbacer, James	Forges, backs, blacksmiths'	II.
Laighton, William	Thrashing machine	I.
Lampson, Curtis M.	Fur cutting machine	III.
Ladd, S. G., assignee of Seth Graham	Fur, extracting hair from	III.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
Lane, Charles	Fire-place and grate	V.
Law, George	Bridges	IX.
Lampman, Nicholas J.	Auger, boring large holes	XIV.
Langdon, Barnabas	Laths, splitting and cutting	XIV.
Lampson, Henry	Window shades, rolling up	XVII.
Ladd, Samuel	Fire arms, overlaying with tin	XIX.
Lee, James A., adm'r of James Lee	Weevil, mode of destroying	I.
Lewis, John	Stoves, heating irons, tailors and hatters	V.
Le Roy, Tunis V.	Heat, economy of, &c.	VI.
Lester, Eben A.	Coaches, panels	X.
Ling, Thomas	Churn and washing machine	I.
Lippincott and Hillyear	Tanning hides	XVI.
Lowell, Philip S.	Churn	I.
L'Hommedieu, Ezra	Auger or bit	XIV.
Lombard, James	Washing machine	XVII.
Loud, Thomas	Piano forte, compensating tubes	XVIII.
Lyman, W. J. and A. E.	Beds, spring, spiral, conical	XVII.
Mack, Orlando	Bee hive	I.
Mathews, Wm	Thrashing machine for rice, &c.	I.
Mayo, Robert	Fire draught, &c.	V.
Marden, Jesse	Balance platform	XII.
Macomber, E. and L. L.	Press cotton, &c.	XII.
Martin, James	Corn grinding, &c.	XIII.
Manning, Cephas	Grist mill, &c.	XIII.
Marston, Obed R.	Power propelling mills	XIII.
Maxton, John	Ink distributor, &c.	XVIII.
McMath, James	Straw cutter, &c.	I.
McCoy, David G.	Thrashing machine	I.
McNary, Isaac	Cooking stove	V.
McGrew, Alexander	Air condensed, for propelling, &c	XI.
McCord, John B.	Water wheel	XI.
McBride, John	Mortising machine	XIV.
McLaughlin and Hill	Planing machine	XIV.
McGeorge, Stephen A.	Washing machine	XVII.
Mervin, Andrew T.	Saw teeth, cutting	II.
Merrick, Solyman	Wrench, screw	II.
Merril, William	Water wheel	XI.
Merril, Elias T.	Lever, crank and combination of	XII.
Meeds, Elwood	Pencil, overpointed, lead	XVIII.
Merriman, Marcus, Jr.	Window sash, bolt, and spring	II.
Miller and Lawes	Hulling cotton seed	I.
Miller, Samuel R.	Compass, surveying, &c.	VIII.
Mills and Furnald	Hydrostatic, &c., machine for propelling	XI.
Miner, Amos	Pumps	XI.
Mix, Phelps	Pumps	XI.
Mitchell, Thomas	Horse power	XIII.
Milliken, J. J. and E. C.	Washing machine	XVII.
Mitchell and Fairbanks	Washing machine	XVII.
Morril, Samuel	Bee hive	I.
Morse, Elijah	Corn sheller	I.
Mott, Jordan L.	Bars for grates, &c.	II.
Morris, John D.	Castings, moulds for iron pipes, &c.	II.
Mosely, Lucilius H.	Silk, throwing or twisting	III.
Morey, Willard	Candle wick, &c.	IV.
Morgan, Jonathan	Glue manufacturing	IV.
Moffat and Taintor	Cooking stove, self-heat retaining	V.
Mott, Jordan L.	Stoves	V.
Mott, Jordan L.	Stoves, knobs or handles	V.
Morse, Andrew, Jr.	Clocks, &c., propelling	VIII.
Morse and Putnam	Coffee mill, &c.	XIII.
Moses, Owen	Grist mill	XIII.
Moore, Daniel B.	Shingles, sawing	XIV.
Morris, Benjamin	Trunks, &c.	XVI.
Morris, John	Cutting meat	XVII.
Morris, Geo. M.	Brushes for blending colors, &c.	XVIII.
Morris, Benjamin	Cutting press for paper	XVIII.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
Murphree, Nimrod	Straw cutter	I.
Murphy, John	Steam engine	VI.
Mulford, Jonathan	Bending masts, &c	VII.
Mulford, Jonathan	Masts, &c., bending	VII.
Munger, Asahel	Level, pendulum	VIII.
Murray, Alexander J	Press, cotton, &c	XII.
Muir, John	Saw mill machinery, &c	XIV.
Myers, John D	Ink	IV.
Napier, David P	Mill stones, dressing	XIII.
Newton, Orrin	Knobs, screw for glass	II.
Newton, Elias W	Grates, &c	V.
Newton, Elias W	Stoves, manufacturing	V.
Newman, Edward	Water wheel, tub	XI.
Needham, Wm. A	Saw mill guage	XIV
Nichols, Jeremiah	Winnowing machine	I.
Nicolet, Julien	Anti-friction wheels	VII
Nevins, W. R	Crackers, cutting, &c	XVII
Norris, Elisha O	Fulling mill, &c	III
Norcross, Leonard	Spinning	III.
Nott, Eliphalet	Cooking stove, &c	V.
Nott, Eliphalet	Cooking stove, &c	V.
Nott, Eliphalet	Furnaces, adjustment of, &c	V.
Nott, Eliphalet	Kitchen ranges	V.
Nott, Eliphalet	Boilers, steam, &c	VI.
Norcross, Leonard	Stumps, &c., extracting	IX.
Norcross, Adna L	Grist mill	XIII.
Norton, Sereno	Harness hames, &c	XVI
Nuckols, H. P. and P	Grist mill	XIII
Oaks, Calvin	Capstands for ships	VII
Ochler, Andrew	Power, &c., engine	XIII.
O'Conner, James	Boats, canal, transhipment of merchandise	VII.
Odiorne, Thomas	Boilers, steam regulating, height of water in	VI.
Odiorne, Thomas	Engine, fire	XI.
Odiorne, Thomas	Pump for ships	XI.
Olcott, Charles	Constructing ships	VII.
Osgood, Lucien	Whipper cotton, oblique	III.
Otis, Charles	Churn, &c	I.
Owings, John	Furnace, smelting, &c	II.
Park, Ira	Churn, &c	I.
Pagett, Washington F	Thrashing machine	I.
Parkhurst, Stephen H	Doffer	III.
Parkhurst, Stephen R	Tenter bars	III.
Parker, Clowes and Garfield	Cement, hydraulic	IV.
Parker, Obadiah	Cement, hydraulic	IV.
Parker, Silvester	Cooking stove, &c	V.
Payne, George J	Stoves	V.
Parry, John C	Stoves, covering the rods, &c	V.
Parmelee, Luman	Boats, canal, sheet iron, twin	VII.
Pardee, William	Clocks, &c	VIII.
Palisse and Durfee	Chain, &c., used on canals, &c	IX.
Pace, Henry, Sen	Springs, carriages	X.
Palmer, Alfred	Cistern water, &c	XI.
Payne, Jonathan	Press, lever	XII.
Page, Jonathan	Mortising machine	XIV.
Page, George	Mortising chisel	XIV.
Pack, George	Staves, cutting, &c	XIV.
Parker, James	Brick, shape of, &c	XV.
Palmer, J. G. H. and A. Beard	Saddles, spring seat	XVI.
Perin, Moses	Chimneys, &c	V.
Peckham, Charles W	Stoves, heating apartments	V.
Peters and Dean,	Pump, rotary	XI.
Percival, Orvill	Auger, &c	XIV.
Pepper, Hart	Staves, saw	XIV.
Phelps, Hiram	Churn	I.
Phelps, Hiram G	Cooking stove, baking	V.
Phelps, David	Press, cheese	XII

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
, Samuel	Saw mill, carriage	XIV.
larnabas	Grates	V.
, Thomas	Water wheel, inclined	XI.
ı, Anthony	Boats, canal and rivers	VII.
Alexander	Thrashing, &c., grain	I.
Henry	Composition, supplying lamps	IV.
, Samuel	Ovens, construction, &c	V.
Rufus	Dock, floating, dry	IX.
, Isaac	Water wheel	XI.
Rufus	Press, cheese, self-adjusting,	XII.
Elisha	Hats, &c	III.
ck and Fisher	Oil of hazze, preparation of	IV.
Philip	Cider mill, cast iron	XIII.
nan, Perry	Bedsteads	XVII.
horse	James Pudney	I.
ı, Joseph	Slabs for fire brick, &c	V.
l, Benjamin	Churn	I.
nd Norcross	Corn sheller	I.
ne, Joel	Cooking stove, flat	V.
Samuel, Jr.	Gauge, steam, for preventing, &c	VI.
ds, Samuel G	Nails, wrought	II.
fer, James	Tin ware, seaming	II.
d, Heman	Trip hammer	II.
Wade and Resor	Cooking stove	V.
ds, Edward	Wheels, felloes, bending	X.
erger, Joseph	Pumps	XI.
ds, Samuel G	Mill, metallic file, &c	XIII.
Nathan	Brick press	XV.
ds, George	Feathers, dressing and cleaning	XVII.
lenry	Truss, spring	XX.
rt, Charles	Mortising chisel	XIV.
, John P	Thrashing machine, clover	I.
ls, Gilbert	Fire place, sheet iron	V.
lson and Fuller	Carriages, measuring distance	X.
nd, David	Coffee mill, and pepper, &c	XIII.
lson, Israel J	Mortising machine	XIV.
Martin	Saw mill, dog guage	XIV.
Martin	Saw mill, dog lever	XIV.
rt, Jesse	Mortar mixing and hoisting brick	XV.
lson, Nathaniel	Bedstead for the sick	XVII.
oseph	Hulling cloverseed and cleaning	I.
n, Nathan	Plough	I.
seph	Thrashing machine	I.
Vm. W	Thrashing machine	I.
and Carson	Cement for cisterns	IV.
Robert	Warming buildings, &c	V.
Joseph, Jr	Roads, constructing, &c	IX.
. G., assignee of Baptiste Maag	Balance, weighing machine	XII.
, Stillman	Washing machine	XVII.
llow, John S	Garments, measuring for	XXI.
, Abraham	Cutting grain, and rake	I.
, T. Jr., assignee of P. Cheek	Thrashing machine	I.
Charles E	Furnace and bake oven	V.
amuel	Lamps, wicks, raising and lowering	V.
David	Power propelling machinery	XIII.
ı, John	Saw cutting timber	XIV.
David	Saw mill, portable	XIV.
ı, Reading	Churn, cutting floats of	I.
nd Kendig	Smut machine	I.
, Wm. H	Castings, metallic pin, &c	II.
, Isaac	Forges, backs, blacksmiths	II.
n, Elapthan	Cooking stove	V.
, J. F. C	Boilers, steam	VI.
, Nathan	Brick press	XV.
n, J. C. F	Tanning, preparing skins	XVI.
Jacob	Washing machine	XVII.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
Scarbrough, Wm.	Hulling rice, polishing	I.
Scott, John	Fire proof chests	II.
Scott, John	Asbestos, use and application of, &c.	V.
Scarbrough, Wm.	Steam, generating	VI.
Scarbrough, Wm.	Propelling steamboats and other vessels	VII.
Seymour, Bradford	Castings, smoothing the oxide and sand on	II.
Seymour and Whipple	Fire alarm	V.
Sellers, Charles and George	Steam engine, locomotive	VI.
Semple, Robert	Truss, gum elastic, for hernia	XX.
Shaw, William	Hinges and tubes	II.
Sheldon, Philo G.	Spinning and twisting straw, &c.	III.
Sheppard, Forrest	Paint composition, metallic, &c.	IV.
Sheldon, Job	Steam engine	VI.
Shultz, Gotlieb	Disengaging horses in navigating canals	VII.
Shermer, Anthony	Car, railroad, turning, &c.	X
Shoavler, Emanuel	Press, tobacco flatener	XII
Shaw, Erastus M.	Mortising and tenoning	XIV
Simpson, Mich. H.	Wool, cleaning	III
Skinner, Elijah	Cooking stove	V.
Skinner and Bean	Fire place	V.
Sleeper, John R.	Grist mill	XIII
Small, John P.	Corn sheller	I
Smith, John and William	Shovel, scoop	II.
Smith, John	Loom, weaving figured goods	III.
Smith, Thomas B.	Cooking ranges	V.
Smith, John L.	Propelling boats by screw wheel, &c.	VII.
Smith, Benjamin M.	Propelling paddle wheels, &c.	VII.
Smith, John K.	Brakes for cars	X.
Smith, Frederick	Grist mill, with small stones	XIII.
Smith, Josiah C	Beds, palm leaf	XVII.
Smith, Bartholomew	Feathers, dressing and purifying	XVII.
Smith, Benjamin M.	Truss for hernia	XX.
Sneed and Carpenter	Thrashing machine	I.
Snyder, Joseph	Fire place, for grates	V.
Snyder, Benjamin F.	Saw mill, dog block	XIV.
Snyder, John, Jr.	Washing machine	XVII.
Southwick, Thomas M.	Stoves, anthracite, wrought iron for	V.
Southwick and Richardson	Shingles, metallic, for roofs	XIV
Soule, A. W.	Washing machine	XVII.
Sperry, Samuel A.	Plough, coulter and shares	I.
Spencer, Anson W.	Boiler, portable	V.
Spoor, Abraham D.	Cooking stove, salamander	V.
Spicer, Isaac	Washing machine	XVII.
Squier, John	Barrels, manufacturer	XIV.
Stearns, Clifton C.	Churn	I.
Sturdivant and Holmes	Cutting grass	I.
Stahl and Diffenbacher	Plough	I.
Steward, David	Flasks and patterns, &c.	II.
Steere, Seril	Window blinds, &c.	II.
Stoddard, James S.	Window sash, &c.	II.
Stevens, Munson L.	Window sash, &c.	II.
Stith, Ferdinando	Flax and hemp, breaking	III.
Stone, Amasa	Loom power, and taking up	III.
Steele, John, Jr.	Sugar boiling, &c.	IV.
Strong, Kellog	Grid iron, rotary	V.
Stone, Samuel	Theodolite	VIII.
Stimpson, James	Railroad, turning short curves	IX.
Steere, Sevil	Window and door blinds	IX.
Stanley and Howard	Horse power, endless leather	XIII.
Stedman, Fisher	Planing machine	XIV.
Stedman, Aaron	Bedstead, machine	XVII.
Steel, Wm.	Brush, art of making	XVII.
Strong, E. B.	Grater	XVII.
Stone, James	Water closet, portable	XVII.
Sutherland, Daniel	Stoves and fire-place	V.
Sutton, Melancthon	Coopering, working off tool	XIV.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
Swett, Nahum	Hair, extracting, &c.	III.
Sweet, Joseph	Staves, dressing	XIV.
Sweet, Peleg	Brick striker	XV.
Swimley and Everhart	Mortar, mixing, &c.	XV.
Swett, Samuel, Jr.	Ironing clothes	XVII.
Taylor and Cowles	Corn sheller	I.
Taylor, Theodore	Saw set	II.
Taylor, Timothy	Harness, hames, fastening, &c.	XVI.
Teasdale, James C.	Ruling machine for paper	XVIII.
Tefft, Jarius S.	Plough	I.
Thompson, Resin	Anodyne, and alterative syrup	IV.
Throckmorton, Reid R.	Planing machine	XIV.
Throckmorton, Reid R.	Planing machine	XIV.
Tinkler, Joseph	Plough	I.
Tiers, Arundius	Wheels for railroad cars, &c.	X.
Tompkins and Gilroy	Loom, damask	III.
Todd and Peabody	Oil, linseed, substitute for	IV.
Town, Ithiel	Bridges	IX.
Townsend, Luther	Currier's knife, and double trimmer	XVI.
Trowbridge, Wm. C.	Pump, rotary	XI.
Trahern, A., H. Heberling, W. E. Lukens, and J. Heberling	Horse power	XIII.
Turner, Joseph	Churn	I.
Turner, Joseph	Corn sheller	I.
Turk, John	Smut machine	I.
Tustin, John	Railroad, platform, &c.	IX.
Turner, Elisha	Power by weights, &c.	XIII.
Tyler, Joseph	Thrashing machine	I.
Ustick, Stephen	Straw cutter	I.
Ustick, Stephen	Straw cutter	I.
Vale, Charles	Ovens, portable	V.
Vancleve, Aaron W.	Boring rocks	IX.
Van Dusen, Washington	Marine railway	IX.
Vanhorn, A. L.	Saddles, riding, of gum elastic, &c.	XVI.
Walker and Brayley	Hulling cloverseed, &c.	I.
Walker, Wm.	Plough	I.
Warren, Edmund	Thrashing machine	I.
Watson and Robinson	Forge and other furnaces, &c.	II.
Wapples, Jas. W.	Spark catcher	VI.
Wade, Horatio B.	Cooking stove	V.
Walker, S. T.	Hydrants	XI.
Walker, David M.	Pump, rotary	XI.
Walley, Samuel S.	Bands, spiral, wheel	XIII.
Wales, Benjamin	Horse power	XIII.
Wade, Abraham	Pendulum power	XIII.
Wadsworth, William	Brick press	XV.
Ward, Ulysses	Brick press, and delivering	XV.
Waring, John	Refrigerator	XVII.
Warren, David	Washing machine	XVII.
Wade, Orin D.	Washing machine and fulling	XVII.
Warren, Joseph	Printing apparatus	XVIII.
Wallace, Victor M.	Pistols, pocket	XIX.
Ward, Allen	Garments, measuring, & marking out coats	XXI.
Webber, Henry	Cheese, turning and curing	I.
West, Stacy	Hulling cloverseed	I.
West and Von Sickle	Stoves	V.
Weemes, John W.	Press, tobacco	XII.
Weaver, Geo. M.	Corn, grinding, &c.	XIII
Weber, Adam	Clay, potter's, purifying	XV.
Webber, Henry	Cheese, machine for turning, &c.	XVII.
Whitman, Ezra, Jr.	Churn, propelling, and cradles	I.
Whiteman, John	Hulling cotton, clover, &c.	I.
Whitehill, James	Thrashing machine	I.
Whittimore, Wm. Jr.	Gin, cotton roller	III.
Whitman, David	Loom, power	III.

PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
Whiten, Nathaniel D.	Baker, tin	V.
Whiting and Mears	Cooking stove	V.
Whipple, C. J. Sprague and M. T. Whipple	Lathe, turning irregular forms	XIV.
Whitman, Samuel	Mortar machine, &c.	XV.
Whitman, Ezra, Jr., assignee of Ezra Whitman	Washing machine	XVII.
White, John	Coffins of artificial stone, &c.	XXII
White, John	Coffins from hydraulic cement	XXII
Wilson, Wm.	Flat or sad iron, &c.	II.
Wilkinson, Jeptha A.	Loom, reeds, heddles or harness	III.
Williams, Elijah	Potash, manufacturing, &c.	IV.
Wing, Paul	Cooking stove	V.
Wiatt, Haut C.	Spark catcher,	VI
Wilson, Wm.	Steam wheel	VI.
Witty, R. T. L.	Bridges, &c.	IX.
Wilkinson, David	Canals, lock, gate	IX.
Withers, John	Car, railroad	X.
Williams and King	Carriages, machinery, &c.	X.
Wing, Warren P.	Spindle and bush, &c., for mills	XIII.
Wilder, Mark	Pegs, shoe, splitting	XIV.
Wilkinson, Wm. W.	Shingles and staves, shaving	XIV.
Williamson, Peregrine	Pen, metallic	XVIII.
Wilkinson, Vernum	Truss, gum elastic, hernia	XX.
Wood, Isaac	Churn	I.
Woods and Talbot	Brads, cutting, &c.	II.
Wolcott, Freeman	Cloth, manufacturing	III.
Wolcott, Anson	Alcohol, extracting from apples	IV.
Wood and Dart	Water power, application to mills	XI.
Woods, Sidney	Lever power, engine, and self-regulating, &c.	XII.
Woodward, Joel	Saddles, spring	XVI.
Wood, John W.	Truss for hernia	XX.
Wright and Ketchum	Pistons for steam engines	VI.
Wright, Peter M.	Grist mill, family	XIII.
Wright, Imla	Mortising machine	XIV.
Wright, Charles C.	Bills of exchange	XVIII.
Wyman, Oliver	Churn	I.
Yale, Linus	Saw mills	XIV.
Young, Mason	Float, rotary, spiral spring, &c.	VI.

[H.]

CLASSIFIED LIST OF PATENTS,

RANTED DURING THE YEAR 1849, WITH THE NAMES OF PATENTEES, PLACES OF RESIDENCE AND DATES OF PATENTS.

CLASS 1.—AGRICULTURE, *including instruments and operations.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
e-hives	Stephen Titcomb	Farmington, Me	Ap'l 10, 1849
e-hives	Arza Gilmore	Wayne, Me	June 5, "
e-hives	George Wheeler	Little Valley, N. Y.	July 3, "
e-hives	Joseph A. Dugdale	Selma, Ohio	July 31, "
g cutters	John D. Filkins	Lima, Ind	Jan. 9, "
g cutting machines	Abner Follet	Windham, Conn	Oct. 16, "
tter working machines	Elias H. Merryman	Springfield, Ill	Nov. 27, "
urns	Charles Murdock	Baltimore, Md	Feb. 20, "
urns	Henry F. Baker	Centreville, Ind	Ap'l 10, "
urns	Samuel Huff	New Vienna, Ohio	Ap'l 24, "
urns	Chapman Warner	Louisville, Ky	June 12, "
urns	George E. Gill and Jos. B. Tillinghast	Chillicothe, Ohio	June 19, "
urns*	Zenas C. Robbins	Washington, D. C	June 26, "
urns	Alexander Hall	Lloydsville, Ohio	Oct. 9, "
urns, atmospheric†	Joseph C. Coult and Augustus B. Davis	Spring Garden, Pa	May 15, "
urns, atmospheric	Sam'l P. Francisco	Reading, Pa	June 19, "
urn dashers	Josiah A. Gridley	Southampton, Mass.	May 1, "
urn dashers	Henry Stanton	Richfield, N. Y	Dec. 18, "
urn dashers, adjustable	Thomas G. Clinton, Geo. H. & Edw. H. Knight	Cincinnati, Ohio	Oct. 2, "
urn dashers, atmospheric	William M. Wright	Pittsburg, Pa	Sep. 11, "
urn dashers, rotary	Lewis W. Colver	St. Louis, Mo	Sep. 18, "
urn dashers, rotary	D. N. Egbert	Hudson, Ohio	Sep. 18, "
tton scrapers	William C. Finney	Fayette co., Tenn	Ap'l 24, "
ltivators	David B. Rogers	Seneca Falls, N. Y.	Jan. 16, "
ltivators	Jeremiah Warner	Reading, Pa	Mar. 13, "
ltivators	George W. Brown	Tylerville, Ill	June 5, "
ltivators, cotton	Samuel W. Akin	Maury co., Tenn	Mar. 20, "
ltivator teeth	Joseph S. Honey	Hartford, Ohio	Ap'l 17, "
ll-barrows	George Colby	Fayetteville, Pa	June 12, "
ills, grain	Albert G. Bartlett, Otis D. Ballo, administrator of the estate of	Cumberland, R. I	Mar. 10, "
ills, grain	Edward Stacy	Strasburg, Pa	June 5, "
ills, grain	Aaron Palmer	Brockport, N. Y	June 19, "
ills, grain, devices for sowing seed in	Pierpont Seymour	East Bloomfield, N.Y	Sep. 25, "
ills, seed	Daniel Custer	Franklin co., Pa	Nov. 13, "
ills, seed	Jacob Mumma	Hummelstown, Pa	Nov. 20, "
uit, paring and coring	Peter W. Hardwick	Wayne co., Ind	Sep. 25, "
ain carriers, construction of	Adam Linhart & Samuel McClain	Fulton, Ohio	Sep. 25, "
ain, destroying weevil in	William Watson	Chicago, Ill	May 8, "
ain gatherers	William Herries	Fayette, N. Y	Mar. 13, "
ain separators	Daniel Woodbury	Perkinsville, Vt	Mar. 27, "
ain separators	Homer Smith	Hector, N. Y	May 15, "

* Antedated June 1, 1849. † Antedated March 19, 1849.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Grain separators	Samuel W. Foster	Scio, Mich	Dec. 4, 1849
Harvesters	James L. and Henry K. Fountain	Rockford, Ill	May 15, "
Harvesters	Nelson Platt	Ottawa, Ill	June 12, "
Harvesters	Pells Manny	Waddams Grove, Ill.	June 26, "
Harvesters, clover	Samuel Krauser	Reading, Pa	Dec. 18, "
Harvesters of clover-heads	John Hinton	Monroe co., Va	May 22, "
Harvesting machines	Oliver Barr	Aurora, Ill	Jan. 16, "
Harvesting machines	Jonathan Haines	Union Grove, Ill	Mar. 27, "
Harvesting machines	Alfred J. Purviance	Updegraffs, Ohio	May 22, "
Harvesting machines, grain carriers for	Jacob J. and Henry F. Mann	Clinton, Ind	June 19, "
Harvesting machines, form of teeth in	Eliakim B. Forbush	Buffalo, N. Y	Nov. 27, "
Hulling machines	Dan Pease, Jr.	Floyd, N. Y	April 3, "
Hulling machines	Dan Pease, Jr.	Floyd, N. Y	Ap'l 10, "
Hullers, rice	Charles Walker	Brooklyn, N. Y	Aug. 14, "
Hullers, rice	D. H. Southworth and James R. Hitchcock	New York, N. Y	Nov. 6, "
Manures, artificial	Philip S. and William H. Chappell	Baltimore, Md	Mar. 27, "
Milking cows, instruments for	Cyrus Knapp	New York, N. Y	Nov. 27, "
Mowing machines	Daniel K. and John K. Harris	Allensville, Ind	Nov. 6, "
Ox yokes	John Chase	Craftsburg, Vt	Nov. 20, "
Ox yoke fastenings	Andrew Hotchkiss	Sharon, Conn	July 17, "
Pea vines, machine for gathering	John B. Stanley	Copiah co., Miss	Jan. 9, "
Planters, corn	B. F. Partridge	Syracuse, N. Y	Jan. 9, "
Planters, seed	Ebenezer J. Dickey	Hopewell cot'n w'ks, Pa	Jan. 23, "
Planters, seed	Jacob C. Miller	Marietta, Pa	Jan. 23, "
Planters, seed *	James D. Willoughby	Chambersburg, Pa	June 5, "
Planters, seed	David Diehl	Hanover, Pa	June 12, "
Planters, seed	Emanuel Myers	Union Mills, Md	June 19, "
Planters, seed	R. H. Springsteed	Wooster, Ohio	July 24, "
Planters, seed	James P. Ross	Lewisburg, Pa	Sep. 25, "
Planters, seed	John W. Sherman	Ontario, N. Y	Nov. 6, "
Planters, seed	Jacob Peirson	Wilmington, Del	Dec. 25, "
Ploughs	Jesse Layman	Lebanon, Ohio	Jan. 2, "
Ploughs	William Richter	Williamsburg, Ind	Jan. 9, "
Ploughs	Herman B. Sinclair	Lyndonville, N. Y	Jan. 9, "
Ploughs	Joseph C. Cloud	May's Landing, N. J.	Feb. 6, "
Ploughs	Wm. T. Sprouse	Petersburg, Ill	Mar. 13, "
Ploughs	John Rich	Troy, N. Y	July 31, "
Ploughs	Jesse Warren	Glenn's Falls, N. Y.	July 31, "
Ploughs	Benjamin Seyler	Franklin co., Pa	Oct. 16, "
Ploughs, attachment of harrows to	Jacob Stroop	Philadelphia, Pa	June 26, "
Ploughs, combined	Abner Leland	Milton, Pa	Jan. 2, "
Ploughs, corn	Stephen Coats	Lafayette, Wis	June 5, "
Ploughs, hill side	Daniel Robb	Sangamon co., Ill	June 26, "
Ploughs, hill side	Allen Eldred	Little Falls, N. Y	July 24, "
Plough, hill side	John W. Thurman	Buchanan, Va	Aug. 28, "
Plough, land side	Abraham Christ	Unity, Ohio	Sep. 18, "
Ploughs, rotary cutter	Thomas J. Tuthill	Elmira, N. Y	Feb. 6, "
Ploughs, seed planter, combined	William Crossdale	Hartsville, Pa	Nov. 27, "
Ploughs, corn, subsoil	Henry Bacon	Tecumseh, Mich	June 5, "
Rakes, horse	Sam'l H. Grinnell	Charlestown, N. H.	Feb. 20, "
Rakes, horse	Calvin Delano	E. Livermore, Me	Feb. 27, "
Rakes, horse, harness adapted to	Warren Parker	Putney, Vt	June 20, "
Rake, teeth, spring	Lyman Baker	Newbury, N. H	May 8, "
Scythe nibs	David Sawyer	Cornish, N. H	May 22, "
Scythe sneaths	Luther Cole	Lafayette, N. Y	Nov. 20, "
Straw cutters	Israel J. Richardson	New York, N. Y	April 2, "
Straw cutters	Jonathan White	Antrim, N. H	May 15, "

* Improvement added, November 20, 1849.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Straw cutters	Lewis Tupper	Auburn, N. Y.	Aug. 28, 1849
Straw cutters	Thos. and Ed. Burrel	Seneca, N. Y.	Sep. 11, "
Straw cutters	Jonathan Sullivan	Davidson co., N. C.	Oct. 30, "
Thrashing and grain separating machines	Israel J. Richardson	New York, N. Y.	Mar. 27, "
Thrashing machines	Thomas N. Shipton	Lewistown, Pa.	Ap'l 10, "
Thrashing machines	Abraham Bloom	Newville, Pa.	Aug. 28, "
Vegetable cutters	Wyllys Avery	Salisb'y Centre, N. Y	July 17, "
Vegetables, cutting, crushing and grinding	Luther B. Fisher	Freeport, Ill.	July 17, "
Wheat cleaning machines	David L. Ewing	Spruce Hill, Pa.	July 17, "
Winnowing machines	Benjamin D. Sanders	Holliday's Cove, Va.	June 19, "
Winnowing machines	John W. Fisk	Rileytown, Ohio.	July 3, "
Winnowing machines	Abraham Straub	Milton, Pa.	July 17, "
Winnowing machines	A. J. Howell	Spruce Hill, Pa.	Nov. 6, "
Winnowing machines, motion of riddles in	Alexander Moffitt	E. Bethlehem, Pa.	Sep. 6, "

CLASS II.—METALLURGY, *and Manufacture of Metals and Instruments therefor.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Alloys, metallic	Herman B. Babcock	New York, N. Y.	June 5, 1849
Awl haft—see class XVI.			
Bands, wrought iron, machine for contracting the circumference of	Wm. Massey	Green co., Ill.	July 3, "
Bell telegraph	Harvey Houghton, Lucretia Houghton, administratrix of	Truxton, N. Y.	Mar. 20, "
Blast generators—see class XI.			
Blinds, apparatus for opening and closing	Cheney Reed and Elias Howe, Jr.	Cambr'geport, Mass.	Sep. 25, "
Bolt machines, method of constructing and operating the header in	David L. Weatherhead	Providence, R. I.	May 8, "
Bolt and rivet machines, rotating disk	Jacob G. Day, assignor to John L. Kingsley	Brooklyn, N. Y. New York, N. Y.	July 3, "
Buckles, suspender, &c.—see class XXI.			
Casting chilled rolls, method of giving a rotary motion to the melted iron in	John C. Parry	Pittsburg, Pa.	Oct. 16, "
Castings, thin iron, process for making	Henry and William E. Bleeker and Samuel D. Vose	Albany, N. Y.	Dec. 25, "
Casting, preparing metallic patterns for*	Theodore G. Bucklin	West Troy, N. Y.	May 8, "
Chills, for casting rasps, files, &c.	Ezra Ripley	Troy, N. Y.	June 5, "
Cores, moulding and compressing	Chapman Warner	Louisville, Ky.	Jan. 9, "
Curry combs	Andrew Hotchkiss	Sharon, Conn.	Mar. 13, "
Curry combs	Wm. Beach	Philadelphia, Pa.	Mar. 13, "
Door holder	Edmund Morris	Burlington, N. J.	June 19, "
Fastener, curvelinear blind opener and shutter	Robert B. Rollf	Cincinnati, Ohio.	Ap'l 17, "
Fastener, stopper, sash	Wm. E. Arnold	Rochester, N. Y.	Mar. 27, "
Fastener, stopper, sash	Wm. Ferrell	Burlington, N. J.	Ap'l 17, "

* *Antedated* November 8, 1848.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Fastener, sash, eccentric	Lewis B. Page	Hartford, Conn	Sept. 4, 1849
Fastener and stopper, self-acting sash	James C. Cochrane	Rochester, N. Y.	Aug. 21, "
Fastener, combined sash and inside shutter	James Bell, assignor to Alfred D. Baldwin	New York, N. Y.	Aug. 21, "
Fastener, window shutter	Jacob Stroop	Philadelphia, Pa.	July 10, "
Fastening and moving window blinds, method of	Cheney Reed	Cambridge, Mass.	May 15, "
Fastening, opening and shutting blinds, method of	Wesley Chase	Buffalo, N. Y.	May 22, "
File cutting machines	George Crosby, Camillus Kidder, administrator of	Baltimore, Md	Dec. 4, "
Furnace, for smelting zinc	Seth Boyden	Newark, N. J.	Mar. 13, "
Furnaces, puddling and re-heating, combination of	Lewis Scofield and Edward Cooper	S. Trenton, N. J. New York, N. Y.	April 3, "
Furnace blast, combination of a double traveling hearth, with a	Lorenzo Sibert	Woodstock, Va	Nov. 20, "
Gold washer	Wm. H. Jennison	New York, N. Y.	Ap'l 3, "
Gold washer	Lewis Jennings	New York, N. Y.	May 1, "
Gold washer	Wm. Ball	Chicopee, Mass.	June 19, "
Gold washer	Michael English	Lagro, Ia.	Aug. 28, "
Gold washers	Louis Lacharme	St. Leger de Feugeret, France	Oct. 2, "
Gold washers, arrangements of the conductors in centrifugal	Lemuel P. Jenks	Boston, Mass.	Oct. 2, "
Gold washer, concentric centrifugal	James H. Bull	New York, N. Y.	Ap'l 3, "
Gold washers, rockers of	Thomas J. Green	Jamaca Plain, Mass.	Oct. 16, "
Gold washer, rotary	Harrison Parry	Pittsburg, Pa.	Ap'l 10, "
Hinge, combined fastener and shutter opener	A. S. Pelton	Clinton, Conn.	Jan. 23, "
Hinges, machine for forming the eyes of	David W. Lyon	West Troy, N. Y.	Sep. 11, "
Hinge and spring, combined double	Andrew B. Taft	New York, N. Y.	Jan. 23, "
Iron, cast, process for welding to wrought, or steel	M. Fisher and W. Martin, Jr.	Newport, Me.	Jan. 23, "
Iron, machinery for drawing out and compressing heated	Henry Burden	Troy, N. Y.	Oct. 16, "
Iron, malleable, process for making direct from the ore	Moses S. Salter, assignor to Moses S. Salter, Horace Norton & Jno. W. Poinier	Newark, N. J.	Nov. 20, "
Keyhole protector	Edward Kershaw	Boston, Mass.	May 22, "
Knobs, shank for mineral door	Joshua Laird	Cincinnati, Ohio	May 22, "
Knobs, method of attaching to doors	James A. Crever	Pittsburg, Pa.	Oct. 16, "
Latch, bolt spring	Elias M. Ray	Norfolk co., Mass.	Oct. 23, "
Locks, bank	Henry Ritchie, assignor to Henry C. Jones	Newark, N. J.	April 3, "
Lock, bank	David M. Smith	Springfield, Vt.	April 3, "
Lock, combination revolving tumbler	Linus Yale	Newport, N. Y.	Feb. 13, "
Lock, door	Sylvester M. Pye	Aquackanock, N. J.	Mar. 13, "
Lock, door	Edwin B. Horn	Boston, Mass.	Sep. 25, "
Locks, door, by which one keyhole serves for two distinct keys	Amos Call	Springfield, Mass.	Feb. 13, "
Locks, door, protector slide for	George F. J. Colburn	Newark, N. J.	Feb. 27, "
Lock, door, by a combined key and guage; also a thief detector	Francis Charles Goffin	Philadelphia, Pa.	Mar. 10, "
Lock, double bolt trick	Lewis M. Hartley	Kensington, Pa.	Dec. 11, "
Lock, eccentric piano	Peter H. Niles	Boston, Mass.	Aug. 7, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Lock, a, machine for turning on sheet metal	John Wright, assignor to Francis Leonard and Daniel Hughes	Rochester, N. Y.	Mar. 10, 1849
Lock, pad	F.C. Goffin & C. Liebrick	Philadelphia, Pa.	June 12, "
Lock, right or left hand*	L. R. Livingston, John Jay Roggen and Calvin Adams	Pittsburg, Pa.	May 1, "
Lock, rotating permutation plate	Henry Ritchie, assignor to Henry C. Jones	Newark, N. J.	June 26, "
Locks, means of changing the combination in revolving tumbler	Lewis Lillie	Troy, N. Y.	Nov. 13, "
Metals, process of burnishing	Edward Satterlee	Albany, N. Y.	Mar. 20, "
Metals, process of hardening	Asa Wheeler	Warwick, Mass.	July 31, "
Metal or wood, machine for carving—see class XIV., "Carving, &c."			
Metallic plates, method of uniting to each other	Samuel Pratt	Cohassett, Mass.	Aug. 14, "
Mill for rolling irregular shapes by means of a cam pattern †	John S. Hall	Columbus, Ohio	Jan. 30, "
Nail, cut, from Muntz's metal	Samuel L. Crocker	Taunton, Mass.	Ap'l 17, "
Nail plate feeder	Hannah and Charles M. Diehl, administrators of William Diehl, dec'd	Norristown, Pa.	Ap'l 10, "
Nut s and bolt heads, machine for dressing	Julius King	Bordentown, N. J.	Feb. 27, "
Ores, reduction of ‡	Alexander Parker	Birmingham, Eng.	Jan. 30, "
Ore separator, electro-magnetic	Ransom Cook	Plattsburg, N. Y.	Feb. 20, "
Ore washers	Jacob Pritchett	Philadelphia, Pa.	Oct. 9, "
Ore washers	Peter Von Schmidt	New York, N. Y.	Oct. 16, "
Ox-shoe machine, roller, with movable dies	Philip Pitts Read	Bowdoin, Me.	Jan. 23, "
Pipes, &c.—see class XI.			
Pipe, lead—see class XII., "Press, centripetal."			
Punching machine	Stephen Kendall	Kalamazoo, Mich.	April 3, "
Punching machine with a combination of adjustable guages	Richard S. Tilden	St. Louis, Mo.	Mar. 10, "
Roses for doors, porcelain, method of mounting	James Bell	New York, N. Y.	Apr. 3, "
Saw-set—see class XIV.			
Screw cutting machine, feeder and nippers for	William Van Anden	Trenton, N. J.	Mar. 27, "
Screw wrench for grasping cylindrical forms	Fred'k H. Bartholomew and Solyman Merrick	New York, N. Y. Springfield, Mass.	Jan. 2, "
Shears, circular and beading tool combined	Joseph F. Flanders	Newburyport, Mass.	Jan. 2, "
Skelps from which iron tubes are made, method of bending	James McCarty	Reading, Pa.	Jan. 9, "
Skelps, tube, dies for bending	Joseph McCulley	Philadelphia, Pa.	Jan. 9, "
Spikes, hook-heading by one motion, machine for	Jonathan Beardsley	Trenton, N. J.	Jan. 9, "
Spike machine	Marcus Maxim	New Castle, Pa.	Mar. 10, "
Spikes, instrument for drawing	Patrick Bryant	Chesterfield, Mass.	Apr. 10, "
Spike machine, revolving die	A. M. George and Eph'm Brown—A. M. George assignor to N. and D. Richards, E. Waterman and A. Tay; and D. Richards, E. Waterman, and A. Tay, assignors to N. Richards; and E. Brown, assignor to Lucius C. Alexander	Nashua, N. H. Lowell, Mass. ..Medford, Mass. Nashua, N. H.	May 18, "

* Improvement added June 5, 1849—see additional Imp. † Re-issued Dec. 4, 1849. ‡ In England, Nov. 18, 1847.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Spike machines, rotating	Edwin B. White	Nashua, N. H.	Aug. 28, 1849
Spike machine, double cylinder	Edwin B. White	Nashua, N. H.	Oct. 16, "
Spike machines, operating the hammers of	Harry A. Wills	Keesville, N. Y.	Dec. 11, "
Spoons, method of making wire strengthened	William Mix	Prospect, Conn.	May 1, "
Springs, spiral, machine for making of wire	William Van Anden	Trenton, N. J.	Aug. 7, "
Steel, process of making*	Norman M. Isham and Erastus E. Marcy	Hartford, Conn.	Oct. 2, "
Stopper, sash, spring and stackle	John W. Hoffman	Philadelphia, Pa.	July 10, "
Stoppers—see "fasteners."			
Tools, machine for grinding and polishing—see class XIV.			
Tuyere, angular rotating	Samuel H. Camp	Hartford, Conn.	Aug. 21, "
Tuyeres conical valve in	Robert D. Porter	Harper's Ferry, Va.	Mar. 27, "
Tuyere, blacksmiths' rotary	Ephraim Harris	Springfield, Mass.	Jan. 9, "
Window sash, method of counterbalancing	William T. Barnes, assignor to Wesley Chase	Buffalo, N. Y.	Dec. 4, "
Wire ropes, tops for	John A. Roebling	Saxonburg, Pa.	Feb. 6, "
Wrench, hinged claw	Adam Hay	Newark, N. J.	Jan. 30, "
Wrench, sliding	Dexter H. Chamberlain, assignor to William A. Dodge	Boston, Mass.	Mar. 20, "

* In England, November 2, 1848.

CLASS III.—MANUFACTURES OF FIBROUS AND TEXTILE SUBSTANCES, *including Machines for Preparing Fibres of Wool, Cotton, Silk, Fur, Paper, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Bags and sacks, manufacture of	Wm. B. Carlock	New York, N. Y.	July 3, 1849
Bobbins, &c., cutting out cylinders for	Lewis Brown	Epsom, N. H.	Ap'l 24, "
Bobbins, driving	Arthur M. Eastman	Boston, Mass.	Ap'l 17, "
Bobbins, machinery for boring	Curtis E. Norris	Peacham, Vt.	Ap'l 24, "
Burring cylinders	Charles G. Sargent	Lowell, Mass.	Oct. 9, "
Burring machines, guards or strippers for	Alexander Wright	Lowell, Mass.	Jan. 21, "
Carding engines	Jeptha Dyson	Fulton, S. C.	Feb. 20, "
Carding machines	Thomas G. Boone	Brooklyn, N. Y.	Mar. 20, "
Carding machines	John McCarty	Somerset, Pa.	June 19, "
Carding machines	Daniel W. Hayden	Windham, Conn.	Oct. 2, "
Cards, &c., cylinders for carrying and supporting	Stephen R. Parkhurst	W. Bloomfield, N. J.	Jan. 23, "
Cloth, apparatus for dressing	John Johnston and John D. Snyder	Saltsburg, Pa.	Mar. 13, "
Cloth, machinery for dressing and folding	John and Hiram H. Higgins	E. Greenwich, R. I.	Mar. 10, "
Cord, machinery for making	Wm. E. Nichols	E. Haddam, Conn.	Dec. 11, "
Cotton batting	H. B. Lawton and H. T. Lawton	Cahoes, N. Y. Troy, N. Y.	Mar. 13, "
Cotton, machinery for spinning	Charles R. Tisdale, Jas. and Thomas Keane—James and Thomas Keane, assignors to C. R. Tisdale	Cornwall, N. Y.	July 17, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Cylinders, toothed, mode of making	John L. Tuttle	Lawrence, Mass.	Oct. 30, 1849
Drawing frames, stop motion for	Charles Danforth	Paterson, N. J.	Jan. 9, "
Drawing heads, mode of changing the gearing of, while in motion	Alfred Jenks	Bridesburg, Pa.	Dec. 11, "
Drying machines	Nelson E. Chaffee	Ellington, Conn.	Feb. 13, "
Flax and hemp, manufacture of	Robert Patterson	N. Hartford, N. Y.	Dec. 18, "
Flax, &c., machinery for spinning	Charles Clark	West Troy, N. Y.	Oct. 2, "
Fringe, shawl, machinery for twisting	Milton D. Whipple, assignor to Bay State Mills	Lowell, Mass.	Nov. 27, "
Gins, cotton	Malcolm McAulay	Thomas co., Ga.	Ap'l 24, "
Gins, cotton	Wm. Y. Layton	Darlington, S. C.	May 22, "
Gins, cotton	Stephen R. Parkhurst	New York, N. Y.	Sep. 11, "
Guides for warpers	Whiting Hayden	Windham, Conn.	Mar. 27, "
Hair, machinery for cleaning	John Radebaugh and J. A. Matlack	Lancaster, Ohio.	Ap'l 17, "
Heddles, wire, machinery for making	Abijah J. Williams	Utica, N. Y.	Sep. 11, "
Hemp brakes	Augustine Smith	Mobile, Ala.	Nov. 20, "
Hemp, machinery for spinning	Wm. Pedrick and Thos. M. Melvin	Charlestown, Mass.	Feb. 6, "
Hemp, machinery for breaking and dressing	Allen Eldred	Openheim, N. Y.	Ap'l 24, "
Hemp, machinery for spinning	Wm. C. Hibbard	Boston, Mass.	Ap'l 24, "
Hemp, machinery for spinning	Garret Van Riper	Jersey city, N. J.	Dec. 4, "
Hemp machines	James Anderson	Louisville, Ky.	Nov. 13, "
Knitting needles	James Hibbert	Providence, R. I.	Jan. 9, "
Lapping machines	Samuel Campbell	N. York Mills, N. Y.	Oct. 9, "
Looms	Alfred Bigelow and Justus Butler	Granville, Ohio	Jan. 16, "
Looms	John Wilson	S. C.	May 29, "
Looms	Augustus Faulkner	Walpole, N. H.	Oct. 23, "
Looms	Henry Bachofner	Springfield, Mass.	Oct. 30, "
Looms, apparatus for operating shuttle boxes of*	Robert B. Goodyer, assignor to James A. Bowie and Chas. Carr.	Philadelphia, Pa.	Mar. 13, "
Looms, apparatus for operating shuttle boxes for	Andrew Allen, assignor to Chas. J. Gardiner	Philadelphia, Pa.	Sept. 4, "
Looms, for weaving figured fabrics	Moses Marshall	Lowell, Mass.	Dec. 11, "
Looms, for weaving figured fabrics	Richard Garsed	Frankford, Pa.	Nov. 6, "
Looms, for weaving Brussels carpets, &c. †	Erastus B. Bigelow	Boston, Mass	Mar. 10, "
Looms, for weaving Brussels carpetings, &c.‡	Erastus B. Bigelow	Boston, Mass	Mar. 13, "
Looms, delivery and take up motion of	Amos H. Boyd	Saco, Me.	Mar. 10, "
Looms, let off motion of	Jeremiah Myers	Bidd eford, Me.	Mar. 10, "
Looms, machines for weaving harness for	Simeon Holton, Jr., and Wm. R. Harris	Middlebury, Vt.	Sept. 4, "
Looms, for figured fabrics	Joseph Reynolds	Providence, R. I.	Oct. 16, "
Looms, Jacquard	Erastus B. Bigelow	Clintonville, Mass.	Oct. 23, "
Looms, for weaving	Augustus Faulkner	Walpole, N. H.	Ap'l 17, "
Looms, power	Roger Lightbown	Eaton, N. Y.	Oct. 30, "
Mats, &c., machinery for making	Daniel Hodgman and A. D. Wyckoff	New York, N. Y.	May 1, "
Mules, self-acting regulators for	Ebenezer C. Sanger	Salem, Mass.	July 3, "
Paper engines, bed plates for	Wm. Clarke	Dayton, Ohio.	Oct. 9, "
Paper, machines for cutting	Alonzo Gilman, assignor to Wm. Johnson	Troy, N. Y.	Sept. 4, "

* Antedated Sep. 13, 1848. † Re-issued Oct. 9, 1849. ‡ Re-issued Nov. 20, 1849.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Paper, machinery for taking and laying from the cutting engine..	John M. Hollingsworth, assignor to J. M. and L. Hollingsworth.....	Milton, Mass..... Boston, Mass.....	Ap'l 17, 1849
Rope machinery.....	Wm. Joslin.....	Waterford, N. Y....	Mar. 10, "
Rope machinery.....	Benjamin Morison	Harrisburg, Pa.....	Mar. 13, "
Ropes, machinery for laying.....	Martin Guild.....	Easton, Mass.....	May 8, "
Rope yarns, tarring.....	Wm. Montgomery, assignor to Wm. Montgomery and Geo. H. Williams.....	Roxbury, Mass.....	May 8, "
Sewing machines.....	Chas. Morey and Joseph B. Johnson.....	Boston, Mass.....	Feb. 6, "
Sewing machines.....	JothamS. Conant.....	Dracut, Mass.....	May 8, "
Sewing machines.....	John Bachelder.....	Boston, Mass.....	May 8, "
Sewing machines.....	Sherburne C. Blodgett and John A. Lerow...	Georgetown, Mass. Boston, Mass.....	Oct. 2, "
Speeder-fliers.....	Theodore T. Abbott....	Manchester, N. H..	May 22, "
Spindles, live and fliers*.....	William MacLardy and Joseph Lewis.....	Manchester, Eng...	July 3, "
Spinning jack.....	Foster Nowell.....	Lowell, Mass.....	Sept. 25, "
Temples, jaw for looms.....	George Draper.....	Ware, Mass.....	Feb. 27, "
Temples, weavers'.....	Lewis K. and Preston Day.....	Sacarappa, Me.....	Feb. 27, "
Twine, manufacture of.....	Thomas G. Boon, assignor to Wm. C. Noyes..	Brooklyn, N. Y. New York, N. Y....	Ap'l 10, "
Waste, machinery for picking....	Joshua Bailey.....	Cohoes, N. Y.....	July 3, "
Wool, &c., manufacture of cylinders for burring.....	Francis A. Calvert	Lowell, Mass.....	Jan. 23, "
Wool cleaning and lapping machine.....	Francis A. Calvert	Lowell, Mass.....	Jan. 23, "
Wool, &c., machinery for picking.	Reuben Daniels and Albert G. Dewey.....	Woodstock, Vt. Hartford, Vt.....	April 3, "
Wool, producing a substitute for, from jute†.....	William O'Connor, administrator of the estate of Henri Meneau de Villeneuve, dec'd..	Jersey City, N. J... Paris, France.....	Ap'l 24, "
Yarn, apparatus for spooling.....	George H. Dodge.....	Attleborough, Mass.	May 8, "

* In England, May 9, 1848. † In France, June 23, 1840.

CLASS IV.—CHEMICAL PROCESSES, MANUFACTURES AND COMPOUNDS, *including Medicine, Dyeing, Color-making, Distilling, Soap and Candle-making, Mortars, Cements, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Beer fountains, portable.....	David Gay.....	Bath, Me.....	Apr. 24, 1849
Brewing and preserving alcoholic drinks.....	John Hopkins.....	W. Brownsville, Pa.	May 8, "
Candles, mould, apparatus for making.....	Andrew L. Brown.....	New Haven, Conn..	Oct. 2, "
Clarification of cane juices*.....	John Spangenberg.....	Jefferson Parish, La.	Mar. 27, "
Compound, lubricating.....	Patrick S. Delvan	Reading, Pa.....	Jan. 16, "
Compound, lubricating.....	Alonzo S. Grenville...	Westborough, Mass.	Jan. 30, "
Compounds, lubricating.....	John Cumberland & Wm. W. Cumberland.....	Mobile, Ala. New Albany, Ind...	April 3, "
Composition for metallic packing in steam engines.....	Green S. Cox.....	Eufaula, Ala.....	Oct. 2, "

* Antedated 27th Sept., 1848.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Distilling apparatus	Charles A. Krechler	Stockholm, Sweden	July 10, 1849
Distilling apparatus	George Riley	New York, N. Y.	Ap'l 17, "
Distilling and rectifying spirits*	Carl Falkman	Stockholm, Sweden.	Nov. 20, "
Distilling sea water, apparatus for	Robert B. Forbes and John Ericsson	Boston, Mass. New York, N. Y.	Oct. 23, "
Dyeing	Samuel Mallerd	Staten Island, N. Y.	Mar. 27, "
Dyeing, apparatus for	Edward Brierly	Lowell, Mass.	Dec. 11, "
Fire-kindling materials—see class V.			
Freezers, ice cream	John Decker	Bell, Md.	Aug. 21, "
Freezers, ice cream	Goldsmith Coffeen, Jr.	Blue Ball, O.	Nov. 13, "
Gas generators	John Watson & Edward Cart, assignors to Albert Woodhull & Chas. Minturn	Hull, England. New York, N. Y.	Sep. 18, "
India rubber, manufacture of†	H. G. Tyer and John Helm	N. Brunswick, N. J.	Jan. 30, "
Lampblack and colophane, manufacture of	Edward Clark	Brooklyn, N. Y.	Jan. 2, "
Marble imitation of—see class XV.			
Meats, salting	Thomas Davison	New York, N. Y.	Aug. 7, "
Paris green, manufacture of	Theodore Schwartz	New York, N. Y.	Ap'l 17, "
Pearlash, manufacture of	William A. Edwards	Mt. Clemens, Mich.	Feb. 13, "
Pills or bullets, machine for, &c.—see class XIX., "Bullets or Pills, &c."			
Rotting hemp and other fibrous materials—apparatus & process.	Lemuel W. Wright	Plainfield, N. H.	Dec. 25, "
Steam-tables	Edwin Hills	Cincinnati, Ohio	Aug. 14, "
Soda water, apparatus for making	Solomon Andrews and Job F. Halsey	Perth Amboy, N. J.	Ap'l 17, "
Sugar, boiling	Knight Reed	New Haven, Conn.	Ap'l 24, "
Sugar-boiling, steam pipes for	Alfred Stillman	New York, N. Y.	June 12, "
Sugars, draining and blanching‡	John Spangenberg	Jefferson Parish, La.	Mar. 20, "
Sugar-pans	Alfred Stillman	New York, N. Y.	Aug. 28, "
Sugar, processes for the manufacture of§	John Scoffern	Up. Holloway, Eng.	Nov. 27, "
Vinegar, manufacture of	James Ruggles	Philadelphia, Pa.	Jan. 30, "

* In Sweden Aug. 5, 1848. † Re-issued, Aug. 7, 1849. ‡ Antedated September 20, 1848. § In Eng., Dec. 8, 1847.

CLASS V.—CALORIFIC, *comprising Lamps, Fire-places, Stoves, Grates, Furnaces for Heating Buildings, Cooking Apparatus, Preparation of Fuel, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Baking apparatus	John P. Hayes	Boston, Mass.	Jan. 30, 1849
Boilers, tin, for cooking stoves, with cast iron bottoms, making	Gibson North	Philadelphia, Pa.	Dec. 11, "
Chimney caps	Charles K. Scudder	Brooklyn, N. Y.	May 15, "
Combustion of fuel*	Richard Coad, assignor to Sam'l G. Fisher	Lambeth, England Mobile, Ala.	May 8, "
Destroying weevil in grain—see class I., Grain, &c.			
Driers, grain, endless bands for	John Massey	New York, N. Y.	Ap'l 17, "
Drying grain	Henry Quinn	N. Alexandria, N. J.	Mar. 10, "
Drying grain	Joseph H. Patten	New York, N. Y.	June 19, "
Fire kindling materials	Levi T. Cheever	E. Greenwich, R. I.	Feb. 20, "

* In England, November 25, 1847.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Fire proof safes*	Edward and Joseph L. Hall	Cincinnati, O.	Aug. 21, 1849
Fuel, consumption in steam boiler and other furnaces	Christian Burckhardt	Cincinnati, O.	June 5, "
Furnaces, air heating	Oliver Tiffany	New York—Post Office not stated	Mar. 20, "
Furnaces, air heating	Horace Bushnell	Hartford, Conn	Mar. 27, "
Furnaces, portable hot air	John P. Hayes	Boston, Mass	Mar. 20, "
Furnaces, registers for hot air†	Charles F. Tuttle	Williamsburg, N. Y.	Jan. 23, "
Furnaces, registers for hot air	Charles F. Tuttle	Williamsburg, N. Y.	Sep. 11, "
Gas burners‡	Daniel H. Soliday	Philadelphia, Pa.	Mar. 20, "
Gas apparatus	Amaria Pierce	Philadelphia, Pa.	Feb. 27, "
Gas apparatus	Andrew Walker, Jr.	Burke, Vt.	Aug. 7, "
Grate bars	Cornelius Kingsland	Alleghany, Pa.	Oct. 16, "
Grates, coal, revolving horizontal	John F. Weishampel	Baltimore, Md.	June 19, "
Heating, apparatus for, by vapor of alcohol	Thomas K. Anderson	Painted Post, N. Y.	Feb. 13, "
Heating, &c.—see Warming, &c.			
Lamps, camphine	Edwin B. Horn	Boston, Mass	Feb. 6, "
Lamps, gas	Horatio G. Sickel	Philadelphia, Pa.	Aug. 7, "
Lamps, gas, argand burners for	John G. Webb	Williamsburg, N. Y.	Aug. 7, "
Lamps, self-lighting	Alexander Bennett	New York, N. Y.	Mar. 27, "
Lamp wicks, elevator tubes for	Robert Cornelius and Charles Welhelm, assignors to Robert Cornelius and Isaac F. Baker	Philadelphia, Pa.	July 24, "
Lanterns, portable	Nathaniel Waterman	Boston, Mass	Dec. 25, "
Lanterns, signal	George Callard	Buffalo, N. Y.	July 31, "
Lanterns, signal	Hugh Sangster	Buffalo, N. Y.	Dec. 18, "
Ovens, portable	Calvin Doane	Wareham, Mass.	Oct. 9, "
Ranges, cooking	John M. Dearborn	Boston, Mass	Mar. 20, "
Ranges, cooking	Frederick S. Merritt	New York, N. Y.	April 3, "
Ranges, cooking	Philip Rollhaus	New York, N. Y.	Sep. 11, "
Ranges, cooking	Nicholas Mason	Roxbury, Mass.	Dec. 4, "
Smoke consuming apparatus—see class VI.			
Stoves	Adolphus Lotze	Cincinnati, O.	Oct. 30, "
Stoves	James Cole	Cincinnati, O.	Oct. 30, "
Stoves, coal grates for	Caleb Isbister	Alleghany city, Pa.	Ap'l 17, "
Stoves, cooking	Evan Louis Evans	Mount Holly, N. J.	Jan. 30, "
Stoves, cooking	Joseph Feinour	Philadelphia, Pa.	Jan. 30, "
Stoves, cooking	R. D. Granger	Albany, N. Y.	Jan. 30, "
Stoves, cooking	R. D. Granger	Albany, N. Y.	Jan. 30, "
Stoves, cooking	John L. Gerow	Marlborough, N. Y.	Jan. 30, "
Stoves, cooking	Wm. Stephenson	Cincinnati, O.	Jan. 30, "
Stoves, cooking	James White	Milton, Pa.	Feb. 6, "
Stoves, cooking	G. B. Whiteside	Brockport, N. Y.	Feb. 6, "
Stoves, cooking	Elisha Vance	Wilmington, O.	Feb. 6, "
Stoves, cooking	Wm. Cobb	Albany, N. Y.	Feb. 6, "
Stoves, cooking	James L. Norton	Perry township, Pa.	Feb. 27, "
Stoves, cooking	George E. Waring	Stamford, Conn.	Mar. 13, "
Stoves, cooking	Wm. E. Bleecker	Albany, N. Y.	Mar. 27, "
Stoves, cooking	Fitch R. Babcock	Westfield, Mass.	Ap'l 10, "
Stoves, cooking	B. T. Roney	Newtown, Pa.	Ap'l 17, "
Stoves, cooking	Horace Halbert	Utica, N. Y.	May 29, "
Stoves, cooking	Daniel Dunham	Pautucket, R. I.	May 29, "
Stoves, cooking	Jordan L. Mott	New York, N. Y.	June 12, "
Stoves, cooking	Ebenezer F. Martin	Rockport, Mass.	June 19, "
Stoves, cooking	Roswell Wilson	Albany, N. Y.	June 19, "
Stoves, cooking	William E. and Henry Bleecker and Samuel D. Vose	Albany, N. Y.	July 3, "
Stoves, cooking	Nicholas Mason	Roxbury, Mass.	Aug. 7, "
Stoves, cooking	David Johnson	Amsterdam, O.	Sept. 4, "

* Re-issued December 18, 1849. † Re-issued May 1, 1849. ‡ Antedated January 9, 1849.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Stoves, cooking	William Wheeler	Troy, N. Y.	Sep. 18, 1849
Stoves, cooking	William Sours	Mt. Jackson, Va.	Sep. 18, "
Stoves, cooking	Elias Kaighn	Camden, N. J.	Sep. 18, "
Stoves, cooking	James Leffel	Springfield, O.	Oct. 9, "
Stoves, cooking	Hannibal Mathews	Cincinnati, O.	Oct. 16, "
Stoves, cooking	Thos. G. Clinton, Geo. H. Knight and E. H. Knight	Cincinnati, O.	Oct. 16, "
Stoves, cooking	James R. Stafford	Cleveland, O.	Oct. 23, "
Stoves, cooking, flues for	Henry Bleecker	Albany, N. Y.	Sep. 18, "
Stoves, for heating apartments	James Shields and Jas. Cole	New York, N. Y. Cincinnati, O.	Mar. 10, "
Stoves, plates for boiler holes and tops of	John B. Chollar	West Troy, N. Y.	Feb. 6, "
Stoves, parlor cooking	Edward R. Brown	Albany, N. Y.	June 5, "
Stoves, self-acting registers for	Washburn Race, assignor to L. S. Bacon	Seneca Falls, N. Y. Le Roy, N. Y.	Feb. 20, "
Stoves, self-regulating dampers for	Benson Owen	Seneca Falls, N. Y.	June 19, "
Warming apartments, apparatus for	Samuel Whitmarsh	Northampton, Mass.	Feb. 13, "

CLASS VI.—STEAM AND GAS ENGINES, *including Boilers and Furnaces therefor, and parts thereof.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Alarm for indicating want of water in boilers	Azel S. Lyman	Upper Alton, Ill.	Dec. 18, 1849
Boilers, arrangement of flues in marine	R. F. Loper	Philadelphia, Pa.	Ap'l 17, "
Boilers and water-heaters of locomotive engines	Thatcher Perkins, assignor to Levi B. Tyng	Baltimore, Md. Lowell, Mass.	June 26, "
Boiler-flues, method of increasing the effective length of, and cleansing	Abner Chapman	Fairfax, Vt.	July 17, "
Boilers, steam, apparatus for ascertaining by inspection the saltness of water in	William Sewell, Jr.	Williamsburg, N. Y.	Feb. 6, "
Boilers, steam, method of regulating the supply of water to	Warren S. Bartle	Newark, N. Y.	Feb. 6, "
Boiler, steam, and furnace therefor, arrangement of	Horace Boardman	Plattsburg, N. Y.	Aug. 14, "
Boilers, tool for attaching tubes to	Thomas Prosser	New York, N. Y.	Ap'l 17, "
Cut-off, adjustable	Julius King	Bordentown, N. J.	Mar. 20, "
Cut-off, adjustable lever with secondary toe. No. 1	Horatio Allen	New York, N. Y.	Feb. 6, "
Cut-off, adjustable lever with secondary toe. No. 2	Horatio Allen	New York, N. Y.	Feb. 6, "
Cut-off, disk, acted upon and regulated by the governor	William McCammon	Albany, N. Y.	May 22, "
Cut-off, piston valve	Gordon McKay	Pittsfield, Mass.	Ap'l 17, "
Cut-off and steam stop of rotary engines	Joseph W. Webb, assignor to Benjamin Gould.	Ledyard, N. Y.	May 15, "
Engine, arrangement of, for using steam expansively	John Ericsson	New York, N. Y.	Nov. 6, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Engines, auxiliary, arrangement and method of working the valves of, for feeding boilers...	Rufus Porter, assignor to Rich'd Van Dyke, Jr	New York, N. Y...	July 10, 1849
Engines, method of ensuring the action of the valves in the direct action pumping.....	Henry R. Worthington and Wm. H. Baker...	New York, N. Y...	April 3, "
Engine, method of working the air pump, and using a condensing as a non-condensing.....	R. F. Loper.....	Philadelphia, Pa....	Aug. 28, "
Engines, method of reversing reacting rotary.....	C. M. Miles	Brockwayville, Pa..	Sept. 4, "
Engines, rotary valve motion cut-off and steam stops.....	Henry G. Thompson ...	New York, N. Y...	Dec. 18, "
Engines, steam, composition for metallic packing in—see class IV., "Composition," &c.			
Engines, vapour, condensers and stuffing boxes of*.....	Jean Baptiste Louis Prosper Verdat du Trembley	Paris, France.....	Dec. 4, "
Filtering apparatus for steamboat boilers.....	Paul K. Hubbs.....	Holmesburg, Pa....	Ap'l 24, "
Filters, arrangement of, for steam boilers.....	Edmund Blunt	Brooklyn, N. Y....	Aug. 14, "
Firebox, removable, for locomotives	John J. De Haven.....	Reading, Pa.....	Ap'l 24, "
Fireboxes of steam boilers, removable water-lining for the.....	John J. De Haven.....	Reading, Pa.....	Oct. 2, "
Fluid-metre.....	William H. Lindsay....	New York, N. Y...	Feb. 20, "
Furnace, multiple grate, for locomotive boilers.....	Frederick Harbach.....	Cleveland, Ohio....	Jan. 30, "
Locomotives, cog-gearing of, for ascending inclined planes.....	William Hoyt.....	Dupont, Indiana....	Ap'l 17, "
Locomotives for ascending inclined planes.....	Andrew Cathcart.....	Madison, Ind.....	Oct. 23, "
Locomotive with driving axle above the boiler.....	Richard H. Emerson....	Portland, Me.....	May 1, "
Pistons, metallic packing for	William Wright	Providence, R. I...	Feb. 27, "
Pistons, metallic, method of expanding.....	James Tuchstone and Jacob H. Clark	Philadelphia, Pa....	Ap'l 17, "
Piston-ring, and method of deriving motion therefrom in rotary engines	John Tremper.....	Little Britain, N.Y..	Ap'l 17, "
Pistons and stuffing boxes, tubular packing for†	William C. Moat	Middlesex, Eng....	Dec. 25, "
Smoke consuming apparatus.....	Frederick P. Dimpfel..	Philadelphia, Pa....	Mar. 13, "
Spark arrester, horizontal.....	T. W. Pratt.....	Springfield, Mass...	Mar. 13, "
Spark arrester, spiral.....	Andrew McCleary	Philadelphia, Pa....	Mar. 13, "
Spark arresters.....	James A. Cutting	Boston, Mass.....	June 26, "
Spark arresters, deflectors for....	Samuel Swett.....	New York, N. Y...	July 24, "
Spark arresters, locomotive, and smoke conductors.....	Josiah F. Flagg.....	Boston, Mass.....	Aug. 7, "
Spark and gas consumers.....	David Matthew.....	Baltimore, Md.....	Feb. 13, "
Steam engines, rotary.....	John C. Howard.....	Williamsburg, N. Y.	April 3, "
Steam engine, an auxiliary, employment of, in combination with the condenser pump.....	John Ericsson.....	New York, N. Y...	April 3, "
Steam engines, rotary, valves of..	James P. Ross	Lewisburg, Pa.....	July 31, "
Steam engines, arrangement of the lever half beam of.....	William A. Lighthall...	Albany, N. Y.....	Oct. 23, "
Valve, piston, enclosed in the steam cylinder.....	Isaac L. Bennett.....	Westerlow, N. Y...	Feb. 6, "
Valves, short slide, by chamfering the corners	James Mulbury.....	Parke sburg, Pa....	Feb. 20, "

* In England, March 10, 1847.

† In England, January 4, 1849.

NTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
cut-off and working the, of			
engines	George H. Corliss	Providence, R. I.	Mar. 10, 1849
liding cut-off	Simon P. Winne	Albany, N. Y.	Ap'l 10, "
foot, of steam engines	S. W. Rogers	Baltimore, Md.	Oct. 2, "
blow-off, of steam boilers,			
d of regulating the	Charles W. Copeland	Brooklyn, N. Y.	Nov. 27, "

VII.—NAVIGATION AND MARITIME IMPLEMENTS, *comprising all Vessels nveyance on Water, their Construction, Rigging and Propulsion, Diving Dresses and Life vers.*

NTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
g, method of ringing, and an lable clapper for the same*	Daniel Jones, Jr.	St. Johns, N. B.	Nov. 22, 1849
anal, or sections thereof, ring cradle for unloading—ass IX., "Cradle," &c.			
flexible, divisions between bes of	Eben T. Starr	New York, N. Y.	Ap'l 17, "
e, self-inflating and folding.	Wm. and Thos. Schnebly	Hagerstown, Md.	Jan. 23, "
e, revers ble	George P. Tewksbury	Boston, Mass.	Aug. 7, "
fe, form of the air cham-	James D. Greene	Cambridge, Mass.	Sep. 25, "
, variable power	Joseph E. Andrews, assignor to Edwin Allyn.	Boston, Mass.	Ap'l 24, "
board, folding	John M. Hoffman	Buffalo, N. Y.	Ap'l 10, "
board, keel	Thomas Maskell	Franklin, La.	Oct. 9, "
bells, deep sea	J. Avery Richards and John W. Wolcott	Boston, Mass.	Ap'l 3, "
bells	J. Rutherford Worster	Baltimore, Md.	Ap'l 24, "
ck—see "life preserving,"			
serving hammock, arrange- of the sections in a	Samuel J. Seely	New York, N. Y.	July 10, "
ers	John Patch	Boston, Mass.	Nov. 27, "
rs, journals for osc llating.	Matthew A. Crooker	New York, N. Y.	Oct. 16, "
rs, reciprocating	Henry W. Hewet	New York, N. Y.	Oct. 9, "
r, sculling	Alexander Bond	Philadelphia, Pa.	June 19, "
ng vessels by reaction	Morris W. Ruthven	New York, N. Y.	May 22, "
achinery—see class III.			
and winch, combination of table	Abraham G. Polhameus.	Nyack, N. Y.	Mar. 27, "
eans for working	William A. Ross	P. Richmond, N. Y.	Oct. 30, "
painter stopper	Chas. Perley and Joshua Terry	New York, N. Y.	June 5, "
oat, canal	Granville Parker	Worcester, Mass.	Mar. 27, "
g apparatus	Jesse Reed	Marshfield, Mass.	June 5, "
l machines	Josiah Kirby	Cincinnati, O.	Aug. 21, "
ls, machinery for dressing.	Jesse Fitzgerald	New York, N. Y.	Aug. 28, "
, blocks for supporting bil- nd keels of	Francis Grice	Washington, D. C.	Feb. 20, "
, machine for paying seams	Samuel Baker	Portsmouth, N. H.	Ap'l 3, "
, method of lifting over s	Abraham Lincoln	Springfield, Ill.	May 22, "

* In Canada, Aug. 22, 1849.

CLASS VIII.—MATHEMATICAL, PHILOSOPHICAL AND OPTICAL INSTRUMENTS, *including Clocks, Chronometers, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Calculating machines	William M. Haines	Rochester, N. Y.	May 1, 1849
Calculating machines	Samuel S. Young	Eaton, Ohio	July 24, "
Callipers, transverse	William J. Van Ness	Baltimore, Md.	Oct. 30, "
Chronometers for longitude	John Sheldon	Millville, N. J.	Nov. 20, "
Galvanic batteries	Adolphus Olmstead	Easton, Pa.	Ap'l 17, "
Parallactic instruments for measuring distances	William Wurdemann	Washington, D. C.	Sep. 11, "
Planetariums	Benjamin O. Swain	Annisquam, Mass	Aug. 31, "
Spectacle frames	Jacob Shaw, Jr.	Hinckley, Ohio	April 3, "
Spectacle frames	Joseph J. Low	Philadelphia, Pa.	Ap'l 17, "
Spectacle glasses	David Hotchkiss and B. R. Norton	Syracuse, N. Y.	Ap'l 17, "
Sun dials	James Scott	Portland, Me.	June 5, "
Telegraphs, electric*	Alexander Bain	London, England	Ap'l 17, "
Telegraphs, electric	Samuel F. B. Morse	Poughkeepsie, N. Y.	May 1, "
Telegraphs, electro-chemical	Robert Smith and Alex. Bain	Blackford, Scotland. Hammersmith, Eng.	Oct. 30, "
Telegraphs, indicating	Lucius G. Curtiss	Cincinnati, O.	Jan. 16, "
Telegraphs, magnetic	Caleb Winegar	Springfield, N. Y.	Mar. 20, "
Telegraph wires, supporters for	L. R. Livingston, J. J. Roggen, Calvin Adams, Amos Kendall and Alfred Vail	Pittsburgh, Pa. Washington, D. C.	Oct. 9, "
Time-pieces, mode of applying springs in	Levi Beach	Bristol, Conn	Sep. 25, "

*In England, December 12, 1846.

CLASS IX.—CIVIL ENGINEERING AND ARCHITECTURE, *comprising Works on Rail and Common Roads, Bridges, Canals, Wharves, Docks, Rivers, Wiers, Dams, and other Internal Improvements, Buildings, Roofs, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Auger for boring earth	Ashley Crafts and Ebenezer Weeks	Auburn, Ohio	Nov. 20, 1849
Bog-cutters—see class I.			
Borer and elevator, earth	Phinehas Dow	Philadelphia, Pa.	Dec. 25, "
Bridges, elliptical or oval truss frame for	James Barnes	Springfield, Mass.	Mar. 27, "
Bridges, method of attaching the arch to the truss frame in	J. Dutton Steele	Pottstown, Pa.	Feb. 20, "
Bridge, swinging	Joseph Ross	Ipswich, Mass.	Jan. 2, "
Cradle, revolving, for unloading canal boats or sections thereof	John Elgar and Benjamin Hallowell	Baltimore, Md. Alexandria, Va.	Ap'l 10, "
Dam or water wier, adjustable	Milow S. Wheaton	Riga, N. Y.	April 3, "
Doors, double hinged water guard for	John Burt	Tiverton, R. I.	April 3, "
Dredging machines, method of directing the scoops in	James Callaghan	New Bedford, Mass.	Jan. 16, "
Drilling machine, combined spring rock	Samuel Jack, 2d	Richmond, Me.	Jan. 30, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Drilling machines, rock, method of turning the drill in	Jesse N. Bolles & Henry G. Knights	Providence, R. I. Boston, Mass.	May 1, 1849
Drilling machines, combined construction and operation of the drill in	George N. Doan	Millerstown, Pa.	Aug. 28, "
Drilling rocks, machinery for	Joseph J. Couch	N. Bridgewat'r, Mass	Mar. 27, "
Drilling sub-marine rock, apparatus for	Thomas Kendall	New York, N. Y.	Ap'l 17, "
Fences	Lucius Leavenworth	Trumansburg, N. Y.	Oct. 30, "
Fences, flood	Henry Reichert	Shippensburg, Pa.	Feb. 27, "
Fences, flood	John Sourbeer	Mount Joy t'p, Pa.	Jan. 30, "
Fences, wire	Henry Jenkins	Pottsville, Pa.	Feb. 13, "
Frog for railroads	John W. Hoffman, assignor to Henry A. Landry	Philadelphia, Pa. Camden, N. J.	Dec. 4, "
Gates	Lorenzo Smith	Easton, Mass.	May 29, "
Gates, arrangement of weight and pulley for closing	Willard Twitchell	Syracuse, N. Y.	Aug. 7, "
Gates, flood, for fences	Stephen D. Hopkins	Brooksville, Va.	Nov. 20, "
Gates, folding	Isaac Meritt	N. W. Bridgew'r, Mas	Dec. 18, "
Gates, railroad, machinery for operating by means of the locomotive	Richard Coffin	W. Haverhill, Mass.	June 5, "
Privies signal for	J. H. Doughty	New York, N. Y.	Sep. 18, "
Railroads, rails and wheels for turning curves of	J. F. B. Flagg	Philadelphia, Pa.	Jan. 23, "
Railroads, apparatus for removing animals from	Louis Montgilion	Elk Ridge Landg, Md	Feb. 13, "
Railroad bar, combined	Alfred B. Seymour	Bordentown, N. J.	Mar. 13, "
Railroad switch, self-adjusting	Erastus C. Matthewson	Hartford, Conn.	Mar. 20, "
Railroad switches, method of fastening	Francis G. Woodward	Worcester, Mass.	Ap'l 24, "
Railroad switch, self-acting	Lucius B. Woods	Bradford, N. H.	May 8, "
Railroad turn out	Carlton Dutton	Rochester, N. Y.	June 5, "
Railroad track, lever to be placed on a, and acted upon by the wheels of cars or locomotives	John W. Hoffman, assignor to Lewis B. Kelly and Benj. Harper	Philadelphia, Pa.	June 19, "
Rail, two part, tubular	John Elgar	Baltimore, Md.	Mar. 10, "
Railway chairs, machine for bending the lips of wrought iron	Samuel A. Cox, assignor to Matthew P. Sawyer and John W. Hall	Malden, Mass. Boston, Mass.	Aug. 28, "
Railway switches, method of operating	William C. Hicks	Rutland, Vt.	May 8, "
Road-scrapers	Benjamin M. Townsend	Quincy, Ill.	Aug. 14, "
Scraper, double revolving	Ashley Crafts and Ebenezer Weeks	Auburn, Ohio.	Dec. 4, "
Stairs, construction of iron	Benjamin F. Miller	New York, N. Y.	Oct. 23, "
Street sweeping machines	C. S. Bishop	Easton, Pa.	Sept. 4, "
Telegraph wires, painting	Benjamin H. Green	Princeton, N. J.	Jan. 9, "
Telegraph wires, suspending	Abijah Pratt and Raymond Graverend	New York, N. Y.	Feb. 27, "
Waste-gate or sluice, self-acting	Ambrose Torrey	Boston, N. Y.	Oct. 2, "
Weather strip	Ebenezer Garnsey	Watertown, Conn.	Oct. 30, "
Weather strip, roller	Hiram C. Brown	Xenia, Ohio.	Jan. 30, "

CLASS X.—LAND CONVEYANCE, *comprising Carriages, Cars, and other Vehicles used on Roads, and parts thereof.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Axles of carriages	John J. Flack	Joliet, Ill.	Sep. 4, 1849
Axles, grease boxes for	John M. Smart	New York, N.Y.	Nov. 6, "
Boxes for railroad cars	Robert Levington	Monroe, Mich.	Ap'l 17, "
Brakes for cars	William Stinehart and John Taggart	Charlestown, Mass.	Feb. 27, "
Brakes for cars, mode of operating	Nehemiah Hodge	Adams, Mass.	Oct. 2, "
Brakes for carriages	Gideon Griest	Adams co., Pa.	June 5, "
Brakes, carriage	Amos B. McFarlan	Downingtown, Pa.	Ap'l 17, "
Brakes for railroad cars	Leverett Treadwell	New York, N. Y.	Ap'l 3, "
Brakes for railroad cars	Horace T. Robbins	Lowell, Mass.	Sep. 4, "
Carriage bodies, hanging	Israel Jackson	West Grove, Pa.	Mar. 20, "
Carriages, railway, annunciators for	Mason H. Ford	Boston, Mass.	May 8, "
Cars, couplings for	Joseph D. Alvord	Springfield, Mass.	Sep. 18, "
Cars, couplings for	H. L. B. Lewis	New York, N.Y.	Sep. 18, "
Cars, couplings for	Warren D. Hatch	Worcester, Mass.	Oct. 2, "
Car couplings, self-acting	Albert G. Safford	Boston, Mass.	Dec. 11, "
Cars, dumping	Alpheus Nettleton	Springfield, Mass.	Jan. 30, "
Cars, for dumping earth, &c.	Michael Berney	Syracuse, N. Y.	Sep. 11, "
Cars, railroad, seats for	Amos W. Snow, assignor to James D. Mowry & P. L. Hyde	Norwich, Conn.	June 26, "
Felloes, machines for cutting out	Joseph and Levi Adams, and Luther H. Moore.	Hadley, Mass. Leverett, Mass.	June 12, "
Hubs and axles, attaching and detaching	R. D. Munson	Williston, Vt.	Jan. 2, "
Hubs and axles, connecting	Charles Chinnock	New York, N. Y.	Jan. 9, "
Hubs and axles, manufacture of	Stephen R. Hunter and Mead Merrill	Cortlandville, N. Y.	Feb. 27, "
Hubs, connecting with axles	Junius Foster	Bridgeport, Conn.	July 24, "
Hubs, connecting to axles	John Kellogg	Madison, Ohio	Nov. 13, "
Hubs, connecting with axles	Elnathan Sampson and A. M. Billings	Claremont, N. H.	Nov. 20, "
Hubs, machinery for preparing for boxes	Isaac Munden	Alleghany city, Pa.	Dec. 11, "
Journals and boxes	Thos. Hopper and Thos. Garrison	N. Brunswick, N. J.	Jan. 2, "
Railway propeller	Robert G. and Oliver P. Hatfield	New York, N.Y.	Ap'l 17, "
Springs, carriage	Hiram T. Hyde	Troy, N. Y.	Ap'l 3, "
Springs, caoutchouc	Fowler M. Ray	New York, N. Y.	Mar. 27, "
Springs for carriages, &c.	Daniel R. Pratt	Worcester, Mass.	Mar. 20, "
Springs for carriages	William S. Thomas	Norwich, N. Y.	Oct. 30, "
Tires, iron wheel, machinery for making	Thomas W. Allen and Charles W. Noyes	Greenbush, N. Y.	Ap'l 3, "
Trucks, railroad	Jacob G. Day	Brooklyn, N. Y.	Jan. 30, "
Trucks for railroad cars	Isaac Knight	Baltimore, Md.	June 12, "
Trucks, railroad	John F. Rogers	Troy, N. Y.	Nov. 27, "
Trucks, railroad	J. W. Moyer	Utica, N. Y.	Dec. 25, "
Wagons, dumping	William H. Start	Smyrna, Del.	Feb. 6, "
Wheels, car, manufacture of	Edward Finch	Liverpool, England.	Aug. 21, "
Wheels, car, method of regulating the contraction of	John Murphy	Kensington, Pa.	Aug. 7, "
Wheels, cast iron car	Linus Dean and A. Higham	Utica, N. Y.	Jan. 9, "
Wheels, cast iron car	William B. Treadwell	Albany, N. Y.	Jan. 9, "
Wheels, cast iron car	James M. Cook	Taunton, Mass.	Jan. 9, "
Wheels, cast iron car	Edward B. Baker	Parishes of St. Philips and St. Michael, S. C.	Jan. 9, "
Wheels, cast iron car	A. T. Converse and Wm. S. Cooley	Norwich, Conn.	Jan. 9, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Wheels, cast iron car	Samuel Truscott	Columbia, Pa	Jan. 16, 1849
Wheels, cast iron plate car	Horace Felton, Perley D. Cummings and Harington Hinckly	Portland, Me	Jan. 23, "
Wheels, cast iron car	Carmi Hart and Nathan Washburn	Rochester, N. Y.	Ap'l 3, "
Wheels, cast iron car	Isaac Van Kuran	Rochester, N. Y.	May 1, "
Wheels, cast iron car	Thomas S. Bourshett	Little Falls, N. Y.	Nov. 13, "
Wheels, cast iron car	Hiram H. Wiser	Rochester, N. Y.	Dec. 4, "
Wheels, cast iron car	Carmi Hart	New York, N. Y.	Dec. 25, "
Wheels for carriages	Isaac B. Ward	Camden, N. J.	Dec. 25, "
Whiffletree hook	A. N. Gray	Cleveland, O.	July 24, "

CLASS XI.—HYDRAULICS AND PNEUMATICS, *including Water-wheels, Wind-mills, and other implements operated on by Air or Water, or employed in raising and delivering Fluids.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Barrel carriages	William Furley	Smithsburg, Md.	Oct. 30, 1849
Bellows	William T. Barnes	Buffalo, N. Y.	Ap'l 24, "
Blast generators	Charles C. Lloyd	Philadelphia, Pa.	Ap'l 17, "
Cocks, stop, for hot water and steam	John Sheriff	Pittsburg, Pa.	Jan. 16, "
Cocks, stop, and filters in combination	A. and H. Johnson	New York, N. Y.	Nov. 27, "
Current wheels, apparatus for	James Secor	St. Louis, Mo.	Feb. 20, "
Engine, air *	Francis Jos. Laubereau	Paris, France	Ap'l 10, "
Engines, fire	John B. Tarr	Albany, N. Y.	Nov. 6, "
Filtering diaphragm, self-regulating	William H. Jennison	New York, N. Y.	May 1, "
Fluid metre—see class VI.			
Forebays, regulating	Henry Mallow	Upper Tract, Va.	Mar. 13, "
Pipes, lugs and links for connecting	Chapman Warner	Louisville, Ky.	May 8, "
Pumps	George W. Fulton	Baltimore, Md.	May 29, "
Pumps	Birdsill Holly, assign'r to Abel Downs, E. Mynderse, Horace C. Silsby and Washburn Race	Seneca Falls, N. Y.	June 5, "
Pumps for raising water	John B. Read	Tuscaloosa, Ala.	Sept. 11, "
Pumps for raising water	Alexander Stiven	New York, N. Y.	Dec. 4, "
Pump pistons, packing	Edwin A. Jeffery	Corning, N. Y.	Dec. 11, "
Pumps, rotary	Peter Sweeney	Buffalo, N. Y.	Nov 27, "
Pumps, rotary, packing for	Albigence W. Cary	Brockport, N. Y.	May 15, "
Pump valves and their arrangement	Thomas Thacher	Wilkesbarre, Pa.	July 17, "
Ram, water	Alpheus D. Smith	Meredith, N. Y.	Ap'l 17, "
Rams, water †	Joshua L. Gatchel	Elkton, Md.	Ap'l 17, "
Tube, combined lap & butt welded	James McCarty	Reading, Pa.	Dec. 18, "
Valve, self-adjusting for regulating the admission of air to fan blowers	Frederick S. Barnard	Zanesville, Ohio	Oct. 23, "
Water, apparatus for raising	William T. Barnes	Buffalo, N. Y.	Mar. 20, "
Water, apparatus for drawing from wells	Jehial T. Farrand	Port Byron, N. Y.	Mar. 20, "
Water, &c., apparatus for filtering	Justin Mulhern	St. Louis, Mo.	July 31, "
Water, apparatus for raising and carrying	James D. Willoughby	Scotland, Pa.	Nov. 6, "
Water, apparatus for drawing from wells	Harvey W. Sabin	Reed's Corners, N.Y.	Dec. 11, "

* In France, October 30, 1847. † Antedated April 10, 1849.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Water-buckets, apparatus for raising and tilting	Harvey W. Sabin and Luther B. Benton	Reed's Corners, N.Y. Penn Yan, N. Y.	Mar. 13, 1849
Water, machinery for raising from wells	Jehial T. Farrand and William Hinman	Port Byron, N. Y.	Oct. 2, "
Water mains, valve-seats, &c., for	Theodore R. Scowden	Cincinnati, Ohio	May 1, "
Water, raising and conveying	John J. and Sam'l P. Cox	Shippensburg, Pa.	April 3, "
Water-wheels	James Trees	Salem township, Pa.	Feb. 13, "
Water-wheels, tide	Freeman F. Myrick	Lynn, Mass.	Mar. 20, "
Water-wheels, re-action	Jesper Smith	Mansfield, N. J.	April 3, "
Water-wheels	William G. Masterson	Amesbury, Mass.	Oct. 9, "
Water-wheels, &c., regulators for —see class XIII., "Regulators," &c.			
Wind-mills	Charles B. Hutchinson	Waterloo, N. Y.	June 5, "
Wind-mills	Emory and Emerson Gore	Charleston, Iowa	July 3, "

CLASS XII.—LEVER, SCREW, *and other Mechanical Power as applied to Pressing, Weighing, Raising, and Moving Weights.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Balances, double scale	Thaddeus Fairbanks	St. Johnsbury, Vt.	Mar. 13, 1849
Balances for weighing	Robert Eastman, assignor to Maria L. Eastman	Concord, N. H.	Mar. 13, "
Balances, pendulum	Elnathan Sampson	Claremont, N. H.	Nov. 6, "
Boom derrick	George E. Warner	Springfield, Mass.	June 5, "
Can-hooks	George Webber	Portland, Me.	Sep. 11, "
Hoisting apparatus	Elijah Learned	Boston, Mass.	Feb. 6, "
Packers, flour	Nathan Kinman	Buffalo, N. Y.	Oct. 30, "
Presses	David McComb	Port Gibson, Miss.	Feb. 27, "
Press, centripetal	James E. Serrell and David Smith	New York, N. Y.	July 3, "
Presses, cheese	Lansing Kellogg	Ravenna, O.	Feb. 6, "
Presses, cheese, self-acting	Almeron McKinney and David Tyler	Clarksfield, O.	Feb. 13, "
Presses, cheese, self-acting	Benjamin H. Otis	Cleveland, O.	Mar. 27, "
Presses, cheese, self-acting	Ira Carter, Jr.	Plattsburg, N. Y.	Aug. 14, "
Presses, cheese, self-acting	Samuel Mann	Alstead, N. H.	Sep. 25, "
Presses, cotton	Thomas Ashcraft	Randolph co., Ala.	Mar. 6, "
Presses, cotton	William J. Johnson	Mobile, Ala.	Mar. 13, "
Presses for cotton, &c., hydraulic	Charles Wilson	Williamsburg, N. Y.	Oct. 9, "
Raising bricks, mortar, &c., extension machines for	James Cox, assignor to Jacob and Jno. Pringle	Ebensburg, Pa.	June 5, "
Scale, lever, for canals, railroads, &c.	Ely Ellicott and Samuel A. Abbott.	Philadelphia, Pa.	Feb. 6, "
Scales, platform	Thaddeus Fairbanks	St. Johnsbury, Vt.	Nov. 20, "
Steelyards for weighing	Tilly Flint and Warren Flint	Westford, Mass. Chelmsford, Mass.	Mar. 20, "
Unloading carts, &c., apparatus for	Charles Downer	Philadelphia, Pa.	July 24, "
Winch, direct and counter motion	Charles Perley	New York, N. Y.	May 29, "
Windlasses, method of fitting the heaving socket and head of	Charles Perley	New York, N. Y.	Nov. 13, "

CLASS XIII.—GRINDING MILLS AND MILL-GEARING, *including Grain Mills, Mechanical Movements and Horse-Powers.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Belts, rope, forks for holding upon drum wheels	Charles Foster	Pompey, N. Y.	Ap'l 24, 1849
Bolts, flour	George W. Brown	Jackson, Mich.	Nov. 27, "
Bran-dusters	Robert M. Dempsey	Indianapolis, Ind.	Dec. 18, "
Corn-shellers	Johnston Small	Bridgewater, Pa.	Mar. 27, "
Corn-shellers	Israel J. Richardson	New York, N. Y.	April 2, "
Corn-shellers	Israel Kepler	Milton, Pa.	Ap'l 24, "
Corn-shellers	David O. Prouty and Ezra Whitman	Philadelphia, Pa. Baltimore, Md.	May 29, "
Corn-shellers	Jacob Mumma	Middletown, Pa.	June 12, "
Corn-shellers	D. W. Harris and E. P. Carter, assignors to Carter, Harris & Carter	Yorkshire, N. Y.	Nov. 6, "
Flour, machinery for separating from bran	Issachar Frost and James Monroe	Albion, Mich.	Feb. 27, "
Flour, machinery for separating from bran, &c.	Edwin and Jas. M. Clark	Lancaster, Pa.	Ap'l 17, "
Flour, machinery for separating from bran	Joseph Johnston	Wilmington, Del.	Ap'l 17, "
Flour, machinery for dressing	Charles Learned and Stephen Hughes	Indianapolis, Ind.	Nov. 27, "
Flouring, process of	David P. Bonnell	Tecumseh, Mich.	Aug. 14, "
Gear, bevelled, machine for cutting teeth of	George H. Corliss	Providence, R. I.	Mar. 10, "
Gearing	Benjamin Arnold	E. Greenwich, R. I.	Oct. 30, "
Horse powers	William Ward	Zanesville, O.	Sep. 11, "
Horse powers, construction of the master-wheel of	John A. Taplin	Fishkill, N. Y.	June 12, "
Horse powers, equalizing the action of gearing in	Charles Caples	Savannah, Mo.	July 31, "
Mill-bushes	Hazard Knowles	Washington, D. C.	Jan. 16, "
Mills for grinding	Thomas A. Chandler	Rockford, Ill.	July 10, "
Mills for grinding	Lewis Fagin	Cincinnati, Ohio	Oct. 30, "
Mills for grinding	David Marsh and Eli B. Nichols	Fairfield, Conn.	Oct. 30, "
Mills for grinding	Samuel W. Powell	Tuscarora Valley, Pa	Dec. 4, "
Mills, hanging shafts in	Edward Bancroft	Philadelphia, Pa.	Oct. 9, "
Mill-shafting	Edward Bancroft	Philadelphia, Pa.	May 22, "
Mill-stones, forming and balancing	Edmund Munson	Utica, N. Y.	Aug. 7, "
Pawls, jointed	Samuel S. Walley	Philadelphia, Pa.	Sep. 11, "
Pulleys, binder, for belts and brakes	Mertoun C. Bryant	Lowell, Mass.	Nov. 13, "
Regulators	J. F. Mascher	Philadelphia, Pa.	Nov. 6, "
Regulators for water-wheels, &c.	James Finlay	Cold Spring, N. Y.	Nov. 13, "
Smut machines	Joseph Heygel	Cumberland, Md.	June 5, "
Smut machines	Albert Buell and Thomas Brown	Lowville, N. Y.	July 17, "

CLASS XIV.—LUMBER, *including Machines and Tools for Preparing and Manufacturing; such as Sawing, Planing, and Mortising, Shingle and Stave, Carpenters' and Coopers' Implements.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Auger, combin'd convex & concave	Nathaniel C. Sanford	Meriden, Conn.	Mar. 27, 1849
Augers, screw, machine for regulating the twist and diameter of	Nathaniel C. Sanford and Lucius B. Smith	Meriden, Conn.	Ap'l 10, "
Auger-stock	William T. Barnes	Buffalo, N. Y.	April 3, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Barrel-carriages—see class XI.			
Barrel-heads, machinery for dressing	Timothy Shepard	Oswegatchie, N. Y.	Nov. 27, 1849
Barrel machinery	Reuben Murdock	Rochester, N. Y.	June 12, "
Boring machines	James H. Aldrich	Portsmouth, N. H.	Nov. 27, "
Boring machines	William H. Wilcox	Tarrytown, N. Y.	May 29, "
Boring and mortising machines	Chandler Carter	Manchester, Mich.	May 22, "
Boring window sash, machinery for	John Wiley	New Orleans, La.	Dec. 25, "
Boxes, machinery for making	Wilbur M. Davis	Gardiner, Me.	Jan. 16, "
Carving machines	Hezekiah Augur	New Haven, Conn.	Jan. 23, "
Carving wood or metal, machine for	Isaac M. Singer	Pittsburg, Pa.	Ap'l 10, "
Chucks	James W. Martin and Edwin Parry	Philadelphia, Pa.	Aug. 28, "
Clapboard machines	Bliss Corser	Mt. Morris, N. Y.	Jan. 16, "
File cutting machines—see class II			
File supporter	Jerome B. Woodruff and Benjamin M. Townsend	Washington, D. C. Quincy, Ill.	Nov. 6, "
Hoops, cheese, &c., machines for cutting and slitting	Patrick Bryant, assignor to Elkanah Ring, Jr., and Thomas Ring	Chesterfield, Mass. Worthington, Mass.	May 15, "
Lathes, chucks for	William Grant	Boston, Mass.	Jan. 23, "
Lathes for turning	Allen Goodman & Hammond Doane	Dana, Mass.	Nov. 6, "
Lathes, varying the speed of the mandril in	William A. Chapin, Jr.	St. Johnsbury, Vt.	Oct. 2, "
Lumber, machinery for working into irregular forms	Rufus Powers	Prescott, Mass.	May 8, "
Mortising machines	Hezekiah B. Smith	Manchester, N. H.	Ap'l 17, "
Mortising machines	John J. Weeks	Buckram, N. Y.	Ap'l 17, "
Planes, bench	Charles S. Beardsley and Simeon Wood	Auburn, N. Y. New York, N. Y.	May 22, "
Planes, for bevel edges	William H. Blye	De Ruyter, N. Y.	Ap'l 10, "
Plane irons, adjusting the position of, and regulating the throats of planes	Emanuel W. Carpenter	Lancaster, Pa.	Mar. 27, "
Planing machines	Dan'l Barnum and Thos. J. Wells—Wells assignor to Barnum	New York, N. Y.	Mar. 13, "
Planing machines	Thos. J. Wells, assignor to Daniel Barnum	New York, N. Y.	Mar. 20, "
Planing machines.*	Joseph P. Woodbury	Boston, Mass.	Mar. 20, "
Planing machines	Charles A. Spring and William H. Derick	Kensington, Pa.	April 3, "
Planing machines	Hazard Knowles, assig'r to John Levy	Washington, D. C. New York, N. Y.	Ap'l 10, "
Planing machines	Hervey Law	Wilmington, N. C.	Ap'l 10, "
Planing machines	Job Sheldon and John S. Barden	New Haven, Ct.	Ap'l 17, "
Planing machines	Enos G. Allen	Boston, Mass.	Ap'l 17, "
Planing machines	Enos G. Allen	Boston, Mass.	Oct. 23, "
Planing machines	Charles H. Peck and Coleman Hicks	St. Louis, Mo.	Ap'l 24, "
Planing machines	Reid R. Throckmorton	Brooklyn, N. Y.	Aug. 28, "
Planing machines	Hugh Jeter, assignor to Jeter and Watson	Lexington, Ky.	Oct. 30, "
Saws	Ebenezer Clark	Rushville, Ill.	April 3, "
Saws, circular, machine for filing	Israel F. Brown	Columbus, Ga.	Oct. 2, "
Saws, machine for filing	Presbery Norton and F. D. Cottle	Tisbury, Mass.	Jan. 9, "
Saw mills	Lemuel Hedge	New York, N. Y.	May 8, "
Saw mills, curvilinear	Thomas Dugard	New York, N. Y.	Nov. 20, "
Saw mills, circular	David Phil ips	Pittsburg, Pa.	July 3, "

* Antedated September 20, 1848.

TIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
s, with cylindrical saws..	Gilbert Hatheway.....	Rochester, Mass....	Ap'l 24, 1849
circular.....	Elhanan W. Scott.....	Lowell, Mass.....	Oct. 23, "
nipper.....	Jacob Muzzy.....	Eddington, Me.....	Feb. 13, "
nitre, machinery for.....	Dennis S. Stow.....	Cohoes, N. Y.....	Oct. 2, "
hip timber, &c., mills for.	John W. Cochran.....	Citizen of the United States, residing in London, Eng.....	Aug. 21, "
rood, machinery for.....	Joseph M. Toy, assignor to David Bonner....	Greenfield, O.....	Ap'l 24, "
machines, feed apparatus	Henry Burt.....	Cohoes, N. Y.....	Oct. 30, "
machinery for dressing..	Lewis Stockwell.....	Sutton, Mass.....	Ap'l 10, "
machinery for dressing..	Franklin Jenney.....	New Bedford, Mass.	Sep. 18, "
machinery for riving and g.....	Enoch R. Morrison.....	Angelica, N. Y.....	Sep. 18, "
and stave dressing ma-	Elisha Luter.....	Robertson co., Tenn.	Jan. 23, "
carpenters', machine for	Jeremiah Essex.....	Bennington, Vt.....	Ap'l 17, "
carpenters', graduating..	Dennis J. George and Norman Millington..	Shaftsbury, Vt.....	Aug. 28, "
achinery for dressing....	George Gilbert.....	New Haven, Ct.....	Ap'l 17, "
achinery for jointing and	Charles Mowry.....	Eldridge, N. Y.....	May 1, "
achinery for dressing....	Hervey Law.....	Wilmington, N. C..	May 8, "
achines for jointing.....	William H. Seymour...	Stockton, N. Y.....	May 22, "
achinery for jointing....	Lewis S. Chichester....	Troy, N. Y.....	July 3, "
achinery for jointing....	Samuel Jobes.....	Moundsville, Va....	Aug. 28, "
achinery for jointing....	Hosea and Lorenzo D. Benson.....	Jackson, Pa.....	Sep. 25, "
achinery for jointing....	David Vaughan.....	Remsen, N. Y.....	Dec. 11, "
achinery for dressing....	Asa Broad.....	Louisville, Ky.....	Dec. 18, "
carpenters' beenhes....	Lebbeus Augur and Jas. L. Lord.....	Chester, Conn.....	May 29, "
and grooving, cutters for	Hazard Knowles, assig'r to John Levy.....	Washington, D. C. New York, N. Y....	Ap'l 17, "
achine for grinding and g.....	Joseph Vaughan, Jr.....	Union, Me.....	Dec. 11, "
.....	Arunah S. Macomber..	Bennington, Vt.....	Jan. 2, "
regular forms, machinery	James M. Eddy, assignor to John Kimball.....	Boston, Mass.....	Feb. 20, "
ight and left lasts, &c., the same pattern, ma- for—see class XVI., ," &c.			
lasts, &c., macninery for, s XVI., "Lasts," &c.			
&c., machinery for cut-	E. B. Cherevoy.....	New York, N. Y....	Ap'l 17, "
machines for cutting from cal blocks.....	Benjamin S. Stedman...	Warren, Mass.....	July 3, "
nanufacture of paper....	Chas. Walker and Geo. Willson.....	Chester, Vt. Weathersfield, Vt...	Mar. 20, "
;, cauls for.....	Hazard Knowles.....	Washington, D. C...	Sep. 25, "
nding.....	Thomas Blanchard.....	Boston, Mass.....	Dec. 18, "

CLASS XV.—STONE AND CLAY MANUFACTURES, *including Machines for Pottery, Glass making, Brick making, Dressing and Preparing Stone, Cements, and other Building Materials.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Bricks, coloring	Cyrus B. Doty	Cortland, N. Y.	Feb. 6, 1849
Brick, machines for moulding	John W. Frost	Croton, N. Y.	Nov. 20, "
Bricks, mortar, &c., extension machines for raising—see class XII., "Raising," &c.			
Brick presses	Valentine Roth	Evansville, Ind	Feb. 20, "
Brick presses	Nathaniel Adams	Canterbury, N. Y.	Ap'l 17, "
Brick presses	William B. Waldran and Godfrey Hargitt	Shelby co., Tenn.	July 10, "
Brick presses	Ferdinand Zisemann	St. Louis, Mo.	Nov. 13, "
Brick presses	Arad Woodworth, 3d, & Samuel Mower	Worcester, Mass. Philadelphia, Pa.	Nov. 27, "
Brick presses	John T. Brown and M. Fuller	Midville, Ga.	Dec. 11, "
Glass pipes, moulds for making	George Scott, assignor to D. O. Ketchum	Albany, N. Y.	Sep. 4, "
Grindstones, machines for making	Cotton Foss	Painesville, Ohio	Ap'l 24, "
Marble, imitation of	Samuel W. Davis	Cincinnati, Ohio	May 22, "
Pottery ware, glazing	C. W. Fenton	Bennington, Vt.	Nov. 27, "
Stone dressing machines	William Eayrs	Concord, N. H.	Dec. 4, "
Stone, machines for dressing	Charles Wilson	Springfield, Mass.	Ap'l 10, "
Stone, machines for polishing	George Fletcher, Sr.	Greensburg, Ind.	Ap'l 24, "

CLASS XVI.—LEATHER, *including Tanning and Dressing, Manufacture of Boots, Shoes, Saddlery and Harness.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Awl haft	Dexter H. Chamberlain, assignor to William A. Dodge	Boston, Mass. W. Cambridge, Mass	Ap'l 3, 1849
Bark, mills for grinding	Sidney A. Bantz and William Andrew	Frederick, Md.	Dec. 4, "
Boot crimps	Sardius Pasco and Elihu Perry	Cato, N. Y.	Ap'l 3, "
Boot crimps	Eli R. Horner and Wm. Holland	Fayetteville, Pa.	Oct. 2, "
Boot crimps	Benjamin Livermore	Hartland, Vt.	Oct. 16, "
Boot heels, cutting	Philander Shaw	Abington, Mass.	Feb. 6, "
Boot heels, metallic	P. S. Devlan, assignor to G. S. Langdon	Reading, Pa. Rising Sun, Md.	July 24, "
Boots, machines for cutting gaiter	William Snell	Easton, Pa.	Ap'l 10, "
Boots and shoes, spring shanks for	John McGinley	Philadelphia, Pa.	Mar. 13, "
Boots and shoes, machinery for cutting soles of	Abram D. Boynton	Haverhill, Mass.	May 8, "
Boots and shoes, machines for pegging	James La Dow	Granville, O.	July 31, "
Boot trees	Henry Wright	New Castle, Me.	Jan. 16, "
Buckles for harness	Hiram Todd	Columbus, O.	May 22, "
Buckle tongues, detachable	Alvah Worster	Hannibal, N. Y.	Dec. 4, "
Cockeyes for harness	Joseph W. Briggs, assig'r to Fowler P. Taylor	Cleveland, O.	June 5, "
Hames	Joseph W. Briggs	Cleveland, O.	May 22, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Hames, apparatus for bending	Abel Gardner	Buffalo, N. Y.	Dec. 11, 1849
Hames, harness	Charles Pope	Syracuse, N. Y.	Nov. 6, "
Harness adapted to horse rakes—see class I., "Rakes," &c.			
Hides, machines for breaking	Isaac S. Hershey	Hagerstown, Md.	Sep. 11, "
Horse collars, machines to manufacture	William Criswell	Butler, Pa.	Oct. 16, "
Lasts, &c., machinery for turning right and left from the same pattern	Samuel Huntington	Middlefield, N. Y.	Feb. 20, "
Lasts, &c., machinery for turning	Elbridge Webber and C. Hartshorn	Gardiner, Me.	Ap'l 3, "
Lasts, machinery for turning right and left	Charles Hartshorne and William B. Shaw	Gardiner, Me.	Nov. 13, "
Lasts, shoe	John Whistler	Carlisle, Pa.	Ap'l 24, "
Leather dressing machines	Charles Slawson	Norwich, N. Y.	Nov. 13, "
Leather, skiving	Benjamin S. Mathews	Stamford, Ct	Ap'l 10, "
Saddles, harness*	Joseph W. Briggs	Cleveland, O.	June 12, "
Saddles, spring	Jeremiah Rhoades and William Pouley	Shippensburg, Pa.	May 22, "
Saddles, spring seat	Robert Smith	Leesburgh, Pa.	Aug. 28, "
Shoes, machines for cutting welts for	Charles Rogers	E. Bridgew'r, Mass.	May 29, "
Tan vats	Tarlton W. Brown	Howardville, Va.	Ap'l 17, "
Tanning by electricity	Epidaurus Irving	New York, N. Y.	Ap'l 24, "
Tanning leather by tannin and acids	Harmon Hibbard	Henrietta, N. Y.	Oct. 16, "
Welt-cutting and splitting machines	John E. Tucker	Suffolk co., Mass.	Nov. 20, "
Welts, machines for cutting	Samuel Keen, Jr	E. Bridgew'r, Mass.	Sep. 4, "

* Improvement added, December 11, 1849.

CLASS XVII.—HOUSEHOLD FURNITURE, *Machines and Implements for Domestic Purposes, including Washing Machines, Bread and Cracker Machines, Feather Dressing, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Apple-parers	Charles P. Carter	Ware, Mass.	Oct. 16, 1849
Apples, paring, coring and slicing	Julius Weed	Painesville, Ohio	July 31, "
Baby tenders, locomotive	J. Cutts Smith	Boston, Mass.	Ap'l 3, "
Bedsteads	Benjamin Hinkley	Troy, N. Y.	Dec. 25, "
Bedsteads	Nathaniel Colver	Boston, Mass.	Ap'l 24, "
Bedstead fastenings	J. Parsons Owen	Norwalk, Ohio	Dec. 11, "
Bedstead fastenings	John Moulton	Ossipee, N. H.	Dec. 11, "
Bedstead fastenings	John D. Sanborn	Bennington, N. Y.	April 3, "
Bedstead fastenings	James Brooke	Baltimore, Ohio	May 15, "
Bedstead fastenings	Devolt Stotlemeyer	Hancock, Md.	May 29, "
Bedstead fastenings	Henry Miller	South Bend, Ind.	Aug. 7, "
Bedstead fastenings	Simeon Hovey	Painesville, Ohio	Aug. 28, "
Bedstead fastenings	James Taylor	Macon, Ga.	Sept. 4, "
Bedsteads for invalids	Isaiah Buckman	South Woodstock, Vt	Ap'l 17, "
Bedsteads for invalids and others	Francis M. Webster	Newport, Ky.	May 8, "
Bedsteads, invalid	John Karney	Cincinnati, Ohio	Oct. 23, "
Bedsteads, machinery for cutting screws on rails of	William F. Converse and Jonathan Burdge	Cincinnati, Ohio	Ap'l 24, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Bedsteads, machinery for cutting screws in	Joseph Garside and Henry J. Betjemann	Harrison, Ohio	Aug. 28, 1849
Bedsteads, portable cot	Abraham McDonough	Philadelphia, Pa	July 10, "
Bedsteads, sofa	John A. Robson	New York, N. Y.	Nov. 20, "
Bedsteads, sofa	Edwin B. Bowditch	New Haven, Conn.	July 24, "
Bread making, preparation of flour for*	Henry Jones, assignor to John Fowler	Bristol, England. Baltimore, Md.	May 1, "
Broom-brushes	Agdalena S. Goodman	Duval co., Fla.	May 8, "
Brooms, machine for making	James Thomas	West Chester, Pa.	Sept. 18, "
Broom, splint, machines	John Crum and Abraham Larwill	Ramapo, N. Y.	Mar. 27, "
Carpet cleaning machines	Joseph Wentworth	Palatine, N. Y.	Nov. 6, "
Carpets, machines to beat and brush	William Peters	Charlestown, Mass.	July 31, "
Chairs, easy	Augustus Clarke	New York, N. Y.	May 1, "
Chairs, fan	Daniel Linzie	Petersham, Mass.	Ap'l 10, "
Chairs, fan rocking	Mary Ann Woodward	Palmyra, N. Y.	Ap'l 24, "
Chairs, springs for	Thomas E. Warren	Troy, N. Y.	Sept. 25, "
Clothes-pins, machinery for turning	Asa Greenwood	Marlboro', N. H.	Dec. 11, "
Coffee-roasters	Thomas R. Wood	Cincinnati, Ohio	Ap'l 17, "
Cutlery, table, method of attaching the tang to the handle of	David N. Ropes	Meriden, Conn	May 29, "
Knives, machine for polishing	Asa Munger and Royal C. Taylor	Auburn, N. Y.	Sept. 11, "
Lounge and chair combined	Abner T. Linikin	Roxbury, Mass.	July 17, "
Mattresses, spring †	Patrick O'Neil	Philadelphia, Pa.	Sept. 4, "
Meat-cutters	Allen Burdick	Glen's Falls, N. Y.	Aug. 21, "
Musquito bars, frame for	L'Aimable P. Jacques	Cincinnati, Ohio	Ap'l 24, "
Rattans—see class XXII.			
Sausage machines	Thomas Lockett	Shoals of Ogeechee, Georgia	May 8, "
Table and bedstead, combined	Frank Leslie	New York, N. Y.	Nov. 20, "
Tables, dining	John C. Nichols	Woburn, Mass.	Aug. 21, "
Tables, extension	Theodore Franck	New York, N. Y.	Ap'l 10, "
Tables, extension	Thomas P. Sherborne	Philadelphia, Pa.	June 26, "
Tables for ship's cabins	William N. Boggs	Southborough, Mass.	May 1, "
Vegetable cutters—see class I.			
Wash-boards	Orrin Rice	Cincinnati, Ohio	Oct. 30, "
Wash-boards, machines for making	William B. Stewart	Cincinnati, Ohio	Oct. 2, "
Washing machines	Sylvester Munson and William H. Pratt	Tremont, Ill.	May 8, "
Washing machines	Daniel L. Walker	Roxbury, N. Y.	June 19, "
Washing machines	Thomas King	West Farms, N. Y.	July 3, "
Washing machines	Lewis W. Colver	St. Louis, Mo.	July 3, "

* In England, March 13, 1845. † Antedated August 4, 1849.

CLASS XVIII.—ARTS, POLITE, FINE AND ORNAMENTAL, *including Music, Painting, Sculpture, Engraving, Books, Printing, Binding, Jewelry, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Account books, blank	Charles Hopkins	New York, N. Y.	Nov. 27, 1849
Accounts, ledger, keeping	Andrew J. Folger	Nantucket, Mass.	Oct. 30, "
Annunciators for railway carriages —see class X., "Carriages," &c.			
Books, machines for turning the leaves of	J. H. Schomacker and Martin Kuemerle	Philadelphia, Pa.	Sep. 4, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Canvass, frames for stretching	Henry Bryant	Hartford, Conn	Sep. 25, 1849
Copying presses, portable	Henry M. Paine	Worcester, Mass.	Oct. 2, "
Daguerreotype apparatus for panoramic views	Isaac Van Bunschoten, John J. Woodbridge and William E. Mann; Woodbridge & Mann, assignors to Van Bunschoten	New York, N. Y.,	Ap'l 17, "
Daguerreotype apparatus for gilding plates	William and William H. Lewis	New York, N. Y.	May 8, "
Daguerreotype pictures, taking	John A. Whipple	Boston, Mass.	Jan 23, "
Daguerreotype plates, apparatus for holding	William and William H. Lewis	New York, N. Y.	Oct. 23, "
Daguerreotype plates, blocks for holding	Alexander Beckers	New York, N. Y.	Oct. 23, "
Drawing boards	Henry W. Chamberlin	Pittsfield, Mass.	Dec. 25, "
Education tables	Edwin Allen	Windham, Conn.	May 1, "
Envelopes, machine for making	Jesse K. Park and Cornelius S. Watson, assignors to William W. Rose	New York, N. Y.	Jan. 23, "
Flutes	Charles G. Christman	New York, N. Y.	Dec. 25, "
Ink fountains	Elijah Jordan	W. Cummington, Mas	Nov. 20, "
Ink stands	Andrew Fife	Philadelphia, Pa.	Aug. 21, "
Maps, making dissected	Samuel McCleary and John Pierce	Hoosic, N. Y.	Sep. 25, "
Melodeons	Charles Austin	Concord, N. H.	June 19, "
Musical instruments	Adoniram F. Hunt and James S. Bradish	Warren, Ohio	Jan. 9, "
Musical instruments	Joseph W. Prescott, assignor to A. and A. J. Prescott	Concord, N. H.	Ap'l 17, "
Musical instruments, reed	B. T. Blodget and H. B. Horton	Akron, Ohio	June 19, "
Musical instruments, keyed	Joseph Alley and Henry W. Poole	Newburyport, Mass. Worcester, Mass.	July 3, "
Musical notation	Ernest Von Heeringen	Pickinsville, Ala.	June 12, "
Music stands	Henry W. Holly	Stamford, Conn.	Feb. 6, "
Paper, machines for folding	Edward N. Smith, assignor to James H. Gray	W. Brookfield, Mass, Springfield, Mass.	Nov. 27, "
Paper—see class III.			
Pens, fountain	David O. Macomber	New York, N. Y.	Aug. 28, "
Pens, metallic	Matthew S. Fife	Philadelphia, Pa.	April 3, "
Piano fortes*	James A. Gray	Albany, N. Y.	Mar. 27, "
Piano fortes	Charles Horst	New Orleans, La.	Ap'l 17, "
Piano fortes, elevating the tops of	Conrad Meyer	Philadelphia, Pa.	Ap'l 10, "
Piano fortes, instruments for teaching music with the	Ernest Von Heeringen	Pickinsville, Ala.	June 26, "
Piano fortes, sounding boards for	Richard Swan, Jr.	New Bedford, Mass.	Nov. 20, "
Piano lock, eccentric—see class II., "Locks," &c.			
Pictures, shading, by metallic leaves	Emanuel Harmon	Cleveland, Ohio	Mar. 27, "
Printing paper hangings	William M. Shaw and Ezra Gould — Gould assignor to Shaw	Newark, N. J.	May 1, "
Printing presses	Jason L. Burdick	Norwich, N. Y.	Mar. 27, "
Postmarking letters, etc., machinery for—see class XXII.			
Ruling paper, machines for	William S. Wilder	Boston, Mass.	Aug. 14, "

* Antedated Sep. 27, 1848.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Surfacing floor oil cloth	William Berry, assignor to James D. Sparkman and Melville Kelsey	Bedford, N. Y. Williamsburg, N. Y. Brooklyn, N. Y.	Oct. 23, 1849
Type casting machines*	John I. Sturgis	New York, N. Y.	Mar. 27, "
Types, casting	John Bachelder and Simon D. Dyer—Dyer assig'r to Bachelder	Boston, Mass. Chelsea, Mass.	July 24, "

* Antedated Sep. 27, 1848.

CLASS XIX.—FIRE ARMS AND IMPLEMENTS OF WAR, *and parts thereof, including the Manufacture of Shot and Gunpowder.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Bullets or pills, machine for spherifying	Jonathan F. Ostrander	New York, N. Y.	Ap'l 3, 1849
Cannon, sectional, bolt and disk	Jesse Fitzgerald	New York, N. Y.	Feb. 6, "
Fire arms, breech loading	Lewis Jennings, assignor to George A. Arrowsmith	New York, N. Y.	Dec. 25, "
Fire arm, cartridge tube and conveyor, forming a repeating	Christian W. Büchel	New York, N. Y.	Feb. 20, "
Fire arms, concealed trigger for	Jacob Pecare and Josiah M. Smith	New York, N. Y.	Dec. 4, "
Fire arms, detached metallic cartridge tube, etc., for	David Minesinger	Beaver, Pa.	Feb. 27, "
Fire arms, method of revolving the hammer of repeating	Christian Sharps	Washington, D. C.	Dec. 18, "
Fire arm, method of connecting the hammer with the cylinder of a revolving	Edwin G. Ripley, administrator of the estate of Edwin Wesson	Hartford, Ct.	Aug. 28, "
Fire arms, moveable breeches for, and the locks and appurtenances for the same	Benjamin Chambers	Washington, D. C.	July 31, "
Fire arm, safety sliding breech	Chas. Hartung, assignor to John B. Klein	Beichlingen, Prussia New York, N. Y.	Nov. 13, "
Fire arm with several stationary barrels and a revolving hammer	George Leonard, Jr.	Shrewsbury, Mass.	Sep. 18, "
Gun barrels, method of boring	Henry Peeler	Boston, Mass.	Feb. 6, "
Gun, combined piston breech and firing cock repeating*	Walter Hunt, assignor to George A. Arrowsmith	New York, N. Y.	Aug. 21, "
Guns, faucet breech	Alonzo D. Perry	New York, N. Y.	Dec. 11, "
Lock, gun	William W. Marston	New York, N. Y.	June 5, "
Lock, gun, rotating tumbler	Thomas W. Harvey, assignor to Frederick Goodell	New York, N. Y. N. Rochelle, N. Y.	June 19, "
Lock for fire arms	Orison Blunt	New York, N. Y.	Dec. 25, "
Lock for fire arms	Jacob Post	Newark, N. J.	May 15, "
Lock, turning nipple, and concealed hammer	Andrew Wurfflein	Philadelphia, Pa.	Dec. 18, "

* In England, Dec. 10, 1847.

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Percussion caps, machine for making	Richard M. Bouton	West Troy, N. Y.	Mar. 20, 1849
Powder magazines, methods of flooding and entering	Charles W. Copeland	Brooklyn, N. Y.	Nov. 6, "
Rifles, attachment of loading muzzle for	Daniel Smith	Scipio, N. Y.	Feb. 20, "
Shot, drop, method of manufacturing	David Smith	New York, N. Y.	May 22, "
Tent frames	Jesse E. Dow	Washington, D. C.	June 5, "

CLASS XX.—SURGICAL AND MEDICAL INSTRUMENTS, *including Trusses, Dental Instruments, Bathing Apparatus, &c.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Accoucheurs' chairs	Newman W. Smith	Shutesbury, Mass.	Oct. 16, 1849
Baths, shower	James Cortfan	Baltimore, Md.	Jan. 23, "
Baths, shower	Ephraim Larrabee	Baltimore, Md.	Jan. 2, "
Baths, shower	Jeremiah Essex	Bennington, Vt.	Sep. 25, "
Braces, body	Henry Mellish	Walpole, N. H.	Jan. 9, "
Braces, shoulder	Samuel S. Fitch	New York, N. Y.	June 5, "
Forceps, dentists'	Edward Bourne	New Bedford, Mass.	Sep. 25, "
Fractured or injured ankles, surgical apparatus for	George W. Yerger	Kensington, Pa.	Mar. 20, "
Hemorrhage, instruments for arresting from internal organs or cavities	Ashbel B. Halle	Norwich, Ct.	Oct. 16, "
Inhalers or lung protectors	Lewis P. Haslett	Louisville, Ky.	June 12, "
Lancets, spring	Joseph Ives	Bristol, Ct.	Mar. 27, "
Lancet, spring	James H. Johnson	St. Louis, Mo.	Ap'l 10, "
Legs, artificial	Benjamin F. Palmer	Meredith, N. H.	Feb. 20, "
Pessaries	Jonathan H. Robinson	Charlestown, Mass.	Aug. 7, "
Pessaries	Josiah B. Andrews	New York, N. Y.	Nov. 13, "
Shoulder braces—see class XXI.			
Supporters, abdominal	Herbert R. and Geo. W. Hubbard	Middletown, Ct.	Ap'l 17, "
Supporters, obstetrical	Abiather Pollard and Simeon Minkler	Au Sable, N. Y. Chazy, N. Y.	Ap'l 24, "
Supporters, spinal	Henry G. Davis	Millbury, Mass.	Aug. 28, "
Teeth, artificial	Henry Laurence	Philadelphia, Pa.	May 1, "
Teeth, compositions for filling	Asa Hill and Samuel G. Blackman	Norwalk, Ct.	Feb. 13, "
Teeth, making artificial	George E. Murray	Philadelphia, Pa.	Dec. 4, "
Teeth, setting	F. H. Clark	New York, N. Y.	Feb. 13, "
Tooth extractors	Enoch Osgood	Bangor, Me.	Jan. 9, "
Trusses	John W. Hood	Mt. Sterling, Ky.	Ap'l 17, "
Trusses	Abijah Smith, assignor to Giliad A. Smith	Kingston, N. Y. New York, N. Y.	May 1, "
Trusses	Lewis A. Hall	Newark, N. J.	May 8, "

CLASS XXI.—WEARING APPAREL, *Articles for the Toilet, &c., including Instruments for Manufacturing.*

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Band boxes, manufacture of	William Tabele	Hærlem, N. Y.	Oct. 9, 1849
Bonnets, pressing	C. C. Dow (a lady)	Thompson, Conn.	July 10, "
Brushes, shaving	William S. Jewett	New York, N. Y.	Ap'l 10, "
Buckles, attaching to suspenders, &c.	John Abernethy	Woodbury, Ct.	July 3, "
Buckles, suspender	Sheldon S. Hartzhorn	Naugatuck, Ct.	Sep. 25, "
Buckles, suspender, machine for making	William Scarlett	Newark, N. J.	Ap'l 10, "
Buckles, suspender, machine for making	Charles A. Lent	Newark, N. J.	Jan. 30, "
Buttons, covered	Peter Kirkham, assignor to William R. Hitchcock & Co	Birmingham, Eng. Waterbury, Ct.	Aug. 14, "
Buttons, manufacture of	Peter Kirkham, assignor to William R. Hitchcock & Co	Birmingham, Eng. Waterbury, Ct.	Dec. 18, "
Buttons, manufacture of, from straw-board	Elisha M. Pomeroy	Wallingsford, Ct.	Aug. 21, "
Button moulds, manufacture of	Josiah Hayden and Rufus Hyde	Williamsburg, Mass. Chesterfield, Mass.	Aug. 7, "
Combs, ivory fine tooth, making	Fenner Bush and Julius H. Pratt	Meriden, Ct.	June 5, "
Hat brims, blocks for setting	Sylvester Billings	Spring Garden, Pa.	Aug. 7, "
Hat brims, curling	Francis Degen	New York, N. Y.	Nov. 13, "
Hats, manufacture of	Adrian Bancker and C. F. Alvord	New York, N. Y.	Jan. 9, "
Hooks and eyes for ladies' dresses*	Henry M'Evoy, assignor to W. Benjamin, Jr.	Birmingham, Eng. New York, N. Y.	Ap'l 17, "
Hooks and eyes, securing to tape and dresses	Charles Atwood	Birmingham, Ct.	Aug. 7, "
Hooks and eyes, attaching to cards	Charles Atwood	Birmingham, Ct.	Sep. 25, "
Pins, dress	Walter Hunt, assignor to Wm. and John Richardson	New York, N. Y.	Ap'l 10, "
Shears, tailors'	Benjamin W. Warner	New York, N. Y.	Jan. 9, "
Shoulder braces	Henry F. Briggs	Poughkeepsie, N. Y.	Ap'l 17, "
Suspenders, elastic cords for	Nelson Goodyear	New York, N. Y.	Oct. 16, "
Tailors' measures	John Carpenter	Uniontown, Pa.	Ap'l 10, "
Tailors' measures	James M. Whitham	Washington, Pa.	Nov. 6, "

* In England, March 27, 1847.

CLASS XXII.—MISCELLANEOUS.

NTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
cleansing	Munson C. Cronk	Auburn, N. Y.	Aug. 7, 1849
fasteners	Isaac Winslow	Philadelphia, Pa.	Dec. 18, "
topper, undetachable swing-	Archibald H. Forbes	New York, N. Y.	Ap'l 10, "
›es, machines for making— ass XVIII.			
:apes	George A. W. Hüttmann and George Koch Kornelio	Philadelphia, Pa.	Mar. 10, "
ok, spring snap	Job Johnson	Brooklyn, N. Y.	Mar. 20, "
chine for crushing	Alfred C. Hobbs and Jno. Brown	New York, N. Y.	Sept. 4, "
:king letters, etc., ma- ry for	Emery N. Moore	Boston, Mass.	Jan. 16, "
, machinery for splitting ressing	Sylvanus Sawyer	Templeton, Mass.	Nov. 13, "
	Alexander Barclay and Charles W. Bontgen	Newark, N. J.	Ap'l 17, "
nimal, adjustable platform.	James Thomas	West Chester, Pa.	June 26, "
nd method of setting it	Thomas A. Davies	New York, N. Y.	June 5, "
:losets, portable	Charles C. Bier	New York, N. Y.	Nov. 13, "

CLASSIFIED LIST OF PATENTS—CONTINUED.

DESIGNS.

DESIGNS.	PATENTEES.	RESIDENCE.	DATE OF PATENT.
Carpets	Peter Lawson	Lowell, Mass.	Ap'l 3, 1849
Carpets	Peter Lawson	Lowell, Mass.	Ap'l 3, "
Carpets	Peter Lawson	Lowell, Mass.	Ap'l 3, "
Furniture ornaments	Isaac F. Baker, assignor to Cornelius & Co.	Philadelphia, Pa.	Ap'l 10, "
Furniture ornaments	Isaac F. Baker, assignor to Cornelius & Co.	Philadelphia, Pa.	Ap'l 10, "
Girandoles	William F. Shaw	Suffolk county, Mass.	Dec. 18, "
Grate, portable	Apollos Richmond, assignor to A. C. Barstow & Co.	Providence, R. I.	Sep. 11, "
Stoves	Joseph G. Lamb and Conrad Harris	Cincinnati, O.	Dec. 11, "
Stoves	Samuel Hill and William B. Cline	Philadelphia, Pa.	Dec. 4, "
Stoves	D. F. Goodhue and Charles Guild	Cincinnati, O.	Dec. 4, "
Stoves	Samuel Clark, assignor to Johnson & Cox	Troy, N. Y.	Nov. 13, "
Stoves	Samuel Clark, assignor to Johnson & Cox	Troy, N. Y.	Nov. 13, "
Stoves	Samuel H. Ransom	Albany, N. Y.	June 26, "
Stoves	Samuel H. Ransom	Albany, N. Y.	June 26, "
Stoves	Charles W. Warnich	Philadelphia, Pa.	June 26, "
Stoves	Samuel W. Gibbs, assignor to Augustus Quackenboss	Albany, N. Y.	June 26, "
Stoves *	Henry C. Fay	Troy, N. Y.	Mar. 10, "
Stoves	N. P. Peck	Springfield, Mass	Jan. 23, "
Stoves	Samuel W. Gibbs, assignor to Jones & Finney	Albany, N. Y.—Pattonsburg, Va.	Mar. 20, "
Stoves	George E. Waring	Stanford, Conn.	Ap'l 10, "
Stoves	Charles J. Woolson	Cleveland, Ohio	Ap'l 10, "
Stoves	Abram Haney, assignor to J. & A. Morrison	Troy, N. Y.	Ap'l 17, "
Stoves	Samuel H. Ransom	Albany, N. Y.	Ap'l 24, "
Stoves	Abram Haney, assignor to Morrison and Tibbits	Troy, N. Y.	May 8, "
Stoves	Samuel W. Gibbs, assignor to North, Harrison & Co.	Albany, N. Y.—Philadelphia, Pa.	July 10, "
Stoves	Samuel Hill and William B. Cline	Philadelphia, Pa.	July 17, "
Stoves	Hosea H. Huntley, assignor to William C. Davis	Cincinnati, Ohio.	Dec. 25, "
Stoves	William L. Sanderson, assignor to Dunham, Oller & Sage	Troy, N. Y.	Dec. 18, "
Stoves	Joseph G. Lamb and Conrad Harris	Cincinnati, Ohio.	Aug. 7, "
Stoves	William L. Sanderson, assignor to Pease, Keeney & Gage	Troy, N. Y.	Aug. 21, "
Stoves	James Wager	Troy, N. Y.	Sep. 25, "
Stoves	James Wager	Troy, N. Y.	Sep. 25, "

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	DATE OF PATENT.	DATE OF RE-ISSUE.
Barrel machinery	William Trapp, Jr.	Dryden, N. Y.	Oct. 1, 1845	Mar. 10, 1849
Bee-hives	Abraham Sanburn	Hamilton county, Ohio	Mar. 26, 1845	Feb. 13, "
Billiard tables, cushion for	Abraham Bassford	New York, N. Y.	Dec. 5, 1848	Dec. 25, "
Canals, transportation on, and railroads *	John Elgar	Baltimore, Md.	Nov. 7, 1835	Ext. & reissue Dec. 25, 1849
Churns, atmospheric	Nathan Chapin	Syracuse, N. Y.	May 9, 1848	May 15, "
Cloth of all kinds, sewing with a running stitch	Benjamin W. Bean	New York, N. Y.	Mar. 4, 1843	Mar. 10, "
Coal, machine for breaking	Joseph Battin	Newark, N. J.	Oct. 6, 1843	Sept. 4, "
Docks, floating dry	John Thomas	Elizabethtown, N. J.	Dec. 20, 1837	May 1, "
Felt fabrics, &c., machinery for making	Hezekiah S. Miller	Cincinnati, Ohio	Mar. 5, 1839	Ap'l 24, "
Fire-proof safes	Edward and Joseph Hall	Cincinnati, Ohio	Aug. 21, 1849	Dec. 18, "
Harvesting machines	Francis S. Pease	Buffalo, N. Y.	Nov. 14, 1848	Dec. 18, "
India rubber, felting with cotton fibre †	Charles Goodyear	New Haven, Conn.	June 15, 1844	Dec. 25, "
India rubber, processes for the manufacture of †	Charles Goodyear	New Haven, Conn.	June 15, 1844	Dec. 25, "
India rubber goods, manufacture of, by means of zinc compounds	Henry G. Tyer and John Helm	New Brunswick, N. J.	Jan. 30, 1849	Aug. 7, "
Looms for weaving carpets and other figured fabrics	Erastus B. Bigelow	Clintonville, Mass.	May 1, 1842	Sep. 11, "
Looms, Brussels	Erastus B. Bigelow	Boston, Mass.	Mar. 20, 1847	Sep. 11, "
Looms, power	Erastus B. Bigelow	Clintonville, Mass.	Feb. 18, 1846	Sep. 25, "
Looms, power, for weaving plaids, &c.	Erastus B. Bigelow	Clintonville, Mass.	Ap'l 10, 1845	Oct. 9, "
Looms for weaving Brussels carpets, &c.	Erastus B. Bigelow	Clintonville, Mass.	Mar. 10, 1849	Oct. 9, "
Looms for weaving Brussels carpeting, &c.	Erastus B. Bigelow	Clintonville, Mass.	Mar. 13, 1849	Nov. 20, "
Mill for rolling irregular shapes by means of a cam pattern	John S. Hall	Columbus, Ohio	Jan. 30, 1849	Dec. 4, "
Registers, hot air	Charles F. Tuttle	Williamsburg, N. Y.	Jan. 23, 1849	May 1, "
Saw mills for re-sawing boards and other timber	Pearson Cresby	Fredonia, N. Y.	Nov. 3, 1841	Mar. 10, "
Screw wrenches	Loring Coes	Worcester, Mass.	Ap'l 16, 1841	June 26, "
Seed planters	Moses and Samuel Pennock	East Marlborough, Pa.	Mar. 12, 1841	Oct. 30, "
Ships, propelling	John Ericsson	New York, N. Y.	Dec. 31, 1844	Mar. 10, "
Stoves, cooking	Elias Johnson and David B. Cox, assignors to R. D. Granger	Troy, N. Y. Albany, N. Y.	July 22, 1845	June 19, "
Wool and cotton, preparing for carding	George L. Mason	Williston, Vt.	Sept. 4, 1847	Mar. 20, "
Wool, machine for cleaning from burs and other foreign matter, and also for ginning cotton	Milton D. Whipple	Lowell, Mass.	Oct. 28, 1840	July 31, "
Winnowing machines	John Thurston	Bath township, Ind.	Jan. 6, 1848	Oct. 9, "

* Surrendered and re-issued under the title—"Boats, sectional, method of attaching to each other by means of a rule joint."

† Issued on one original patent.

I.

ALPHABETICAL LIST OF PATENTEES FOR THE YEAR 1849.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6461	Abbott, Theodore T.	Speeder fliers	III.
	Abbott, Samuel A.—see Ellicott and Abbott.		
6575	Abernethy, John	Buckles, attaching to suspenders, &c.	XXI.
	Adams, Calvin—see Livingston, Roggen, and Adams.		
	Adams, Calvin—see Livingston, Roggen, Adams, Kendall and Vail.		
6521	Adams, Joseph and Levi, and Luther Henry Moore	Felloes, machine for cutting out	X.
6361	Adams, Nathaniel	Brick presses	XV.
6204	Akin, Samuel W.	Cultivators, cotton	I.
6909	Aldrich, James H.	Boring machines	XIV.
	Alexander, Lucius C.—see George and Brown.		
6693	Allen, Andrew, assignor to Charles J. Gardner	Looms, apparatus for operating shuttle-boxes for	III.
6407	Allen, Edwin	Education tables	XVIII.
6809	Allen, Enos G.	Planing machines	XIV.
6365	Allen, Enos G.	Planing machines	XIV.
6092	Allen, Horatio	Cut-off, adjustable lever, with secondary toe, No. 1	VI.
6093	Allen, Horatio	Cut-off, adjustable lever, with secondary toe, No. 2	VI.
6254	Allen, Thomas W., and Charles W. Noyes	Tires, iron wheel, machinery for making	X.
6565	Alley, Joseph and Henry W. Poole	Musical instruments, keyed	XVIII.
	Allyn, Edwin—see Joseph E. Andrews.		
	Alvord, Charles F.—see Bancker and Alvord.		
6728	Alvord, Joseph D.	Cars, couplings for	X.
6860	Anderson, James	Hemp machines	III.
6107	Anderson, Thomas K.	Heating, apparatus for, by vapor of alcohol	V.
	Andrew, William—see Bantz and Andrew.		
6396	Andrews, Joseph E., assignor to Edwin Allyn	Capstan, variable power	VII.
6861	Andrews, Josiah B.	Pessaries	XX.
6333	Andrews, Solomon and Job F. Halsey	Soda water, apparatus for making	IV.
6821	Arnold, Benjamin	Gearing	XIII.
6227	Arnold, William E.	Fastener, stopper, sash	II.
	Arrowsmith, George A.—see Walter Hunt.		
	Arrowsmith, George A.—see Lewis Jennings.		

6628	Atwood, Charles	Hooks and eyes, securing to tape and dresses	XXI.
6745	Atwood, Charles	Hooks and eyes, attaching to cards	XXI.
6058	Augur, Hezekiah	Carving machines	XIV.
6485	Augur, Lebbeus and James L. Lord	Stops for carpenters' benches	XIV.
6543	Austin, Charles	Melodeons	XVIII.
6599	Avery, Wyllys	Vegetable cutters	I.
6292	Babcock, Fitch R.	Stoves, cooking	V.
6502	Babcock, Herman B.	Alloys, metallic	II.
6439	Bachelder, John	Sewing machines	III.
6604	Bachelder, John and Simon D. Dyer—Dyer assignor to Bachelder	Types, casting	XVIII.
6823	Bachofner, Henry	Looms	III.
6508	Bacon, Henry	Ploughs, corn, subsoil	I.
	Bacon, L. S.—see Washburn Race.		
6579	Bailey, Joshua	Waste, machinery for picking	III.
	Bain, Alexander—see Smith and Bain.		
6328	Bain, Alexander	Telegraphs, electric	VIII.
6024	Baker, Edward B.	Wheels, cast iron car	X.
215	Baker, Isaac F. assignor to Cornelius & Co.	Furniture ornaments	Design.
216	Baker, Isaac F. assignor to Cornelius & Co.	Furniture ornaments	Design.
	Baker, Isaac F.—see Cornelius and Welhelm.		
6298	Baker, Henry F.	Churn	I.
6424	Baker, Lyman	Rake teeth, spring	I.
6262	Baker, Samuel	Vessels, machine for paying seams of	VII.
	Baker, William H.—see Worthington and Baker.		
	Baldwin, Alfred D.—see James Bell.		
6535	Ball, William	Gold washer	II.
	Ballou, Otis D.—see Albert G. Bartlett.		
6010	Bancker, Adrian and Charles F. Alvord	Hats, manufacture of	XXI.
6464	Bancroft, Edward	Mill shafting	XIII.
6780	Bancroft, Edward	Mills, hanging shafts in	XIII.
6916	Bantz, Sidney A. and William Andrew	Bark, mills for grinding	XVI.
6330	Barclay, Alexander and Charles W. Bontgen	Skate	XXII.
	Barden, John S.—see Sheldon and Barden.		
6820	Barnard, Frederick S.	Valves, self adjusting, for regulating the admission of air to fan blowers	XI.
6230	Barnes, James	Bridges, eliptical or oval truss frame for	IX.
6191	Barnes, William T.	Water, apparatus for raising	XI.
6400	Barnes, William T.	Bellows	XI.
6256	Barnes, William T.	Auger-stock	XIV.
6917	Barnes, William T. assignor to Wesley Chase	Window sash, method of counterbalancing	II.
6185	Barnum, Daniel and Thomas J. Wells—Wells assignor to Barnum	Planing machine	XIV.

ALPHABETICAL LIST—CONTINUED.

NUMBERS.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
	Barnum, Daniel—see Thomas J. Wells		
6034	Barr, Oliver	Harvesting machine	I.
227	Barstow, A. C	Stoves, cooking	Design.
	Barstow, A. C. & Co.—see Apollos Richmond.		
6002	Bartholomew, Frederick H. and Solyman Merrick	Screw wrench for grasping cylindrical forms	II.
6105	Bartle, Warren S	Boilers, steam, method of regulating the supply of water to	VI.
5992	Bartlett, Albert G.—Otis D. Ballou, administrator of	Drills, grain	I.
155	Bassford, Abraham	Billiard tables, cushion for	Re-issue.
142	Battin, Joseph	Coal, machine for breaking	Re-issue.
	Bay State Mills—see Milton D. Whipple.		
6739	Beach, Levi	Time pieces, mode of applying springs in	VIII.
6181	Beach, William	Curry-combs	II.
131	Bean, Benjamin W	Cloth of all kinds, sewing with a running stich	Reissue.
6459	Beardsley, Charles S. and Simeon Wood	Planes, beach	XIV.
6005	Beardsley, Jonathan	Spikes, hook heading, by one motion, machine for	II.
6812	Beckers, Alexander	Daguerreotype plates, blocks for holding	XVIII.
6280	Bell, James	Roses for doors, porcelain, method of mounting	II.
6658	Bell, James, assignor to Alfred D. Baldwin	Fastener, combined sash and inside shutter	II.
	Benjamin, W. Jr.,—see Henry McEvoy.		
6244	Bennett, Alexander	Lamps, self lighting	V.
6096	Bennett, Isaac L	Valves, piston, enclosed in the steam cylinder	VI.
6744	Benson, Hosea and Lorenzo D	Staves, machinery for jointing	XIV.
	Benton, Luther B.—see Sabin and Benton.		
6712	Berney, Michael	Cars for dumping earth, &c.	X.
6816	Berry, William, assignor to James D. Sparkman and Melville Kelsey	Surfacing floor oil cloth	XVIII.
	Betjemann Henry J.—see Garside and Betjemann.		
6862	Bier, Charles C	Water-closets, portable	XXII.
6035	Bigelow, Alfred, and Justus Butler	Looms	III.
6153 & 147.	Bigelow, Erastus B	Looms for weaving Brussels carpets, &c	III. and Re-issue.
6186 & 150.	Bigelow, Erastus B	Looms for weaving Brussels carpeting, &c	III. and Re-issue.
143	Bigelow, Erastus B	Looms for weaving carpets and other figured fabrics	Re-issue.
144	Bigelow, Erastus B	Looms, Brussels	Re-issue.
145	Bigelow, Erastus B	Looms, power	Re-issue.
146	Bigelow, Erastus B	Looms, power, for weaving plaids, &c	Re-issue.

6806	Bigelow, Erastus B.	Looms, Jacquard	III.
	Billings, A. M.—see Sampson and Billings.		
6627	Billings, Sylvester.	Hat brims, blocks for setting	XXI.
6699	Bishop, C. S.	Street sweeping machines	IX.
	Blackman, Samuel G—see Hill and Blackman.		
6951	Blanchard, Thomas	Wood, bending	XIV.
6718	Bleecker, Henry	Stoves, cooking, flues for	V.
6969	Bleecker, Henry and William E. and Samuel D. Vose	Castings, thin iron, process of making	II.
6222	Bleecker, William E.	Stoves, cooking	V.
6564	Bleecker, William E. and H. and Samuel D. Vose	Stoves, cooking	V.
6531	Blodget, B. T. and H. B. Horton	Musical instruments, reed	XVIII.
6766	Blodgett, Sherburne C. and John A. Lerow	Sewing machines	III.
6679	Bloom, Abram	Thrashing machines	I.
6650	Blunt, Edmund	Filters, arrangement of, for steam boilers	VI.
6966	Blunt, Orison	Lock for fire-arms	XIX.
6304	Blye, William H.	Planes for bevel edges	XIV.
6649	Boardman, Horace	Boiler, steam, and furnace therefor, arrangement of	VI
6402	Boggs, William N.	Tables for ships' cabins	XVII.
6417	Bolles, Jesse N., and Henry G. Knights	Drilling machines, rock, method of turning the drill in	IX.
6533	Bond, Alexander	Propeller, sculling	VII.
6648	Bonnell, David P.	Flouring, process of	XIII.
	Bonner, David—see Joseph M. Toy.		
	Bontgen, Charles W.—see Barclay and Bontgen.		
6197	Boone, Thomas G.	Carding machines	III.
6295	Boone, Thomas G., assignor to William C. Noyes	Twine, manufacture of	III.
6741	Bourne, Edward	Forceps, dentists'	XX.
6863	Bourshett, Thomas S.	Wheels, cast iron car	X.
6196	Bouton, Richard M.	Percussion caps, machine for making	XIX.
6607	Bowditch, Edwin F.	Bedsteads, sofa	XVII.
	Bowie, James A.—see R. B. Goodyer.		
6157	Boyd, Amos H.	Looms, delivery and take-up motion of	III.
6180	Boyden, Seth	Furnace for smelting zinc	II.
6444	Boynton, Abram D.	Boots and shoes, machinery for cutting soles of	XVI.
	Bradish, James S.—see Hunt and Bradish.		
6932	Brierly, Edward	Dyeing, apparatus for	IV.
6364	Briggs, Henry F.	Shoulder braces	XXI.
6465	Briggs, Joseph W.	Hames	XVI.
6518 & 92	Briggs, Joseph W.	Saddles, harness	XVI. and adt'l imp.
6490	Briggs, Joseph W., assignor to Fowler P. Taylor	Cockeyes for harness	XVI.
6965	Broad, Asa	Staves, machinery for dressing	XIV.
6451	Brooke, James	Bedstead fastenings	XVII.
6759	Brown, Andrew L.	Candles, mould, apparatus for making	IV.
6499	Brown, Edward R	Stoves, parlor cooking	V.

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
	Brown, Ephraim—see George and Brown.		
6511	Brown, George W.	Cultivators	I.
6897	Brown, George W.	Bolts, flour	XIII.
6078	Brown, Hiram C.	Weather strip, roller	IX.
6769	Brown, Israel F.	Saws, circular, machinery for filing	XIV.
	Brown, John—see Hobbs and Brown.		
6933	Brown, John T., and Moses Fuller	Brick presses	XV.
6391	Brown, Lewis	Bobbins, &c., cutting out cylinders for	III.
6340	Brown, Tarlton W.	Tan vats	XVI.
	Brown, Thomas—see Buell and Brown.		
6731	Bryant, Henry	Canvas, frames for stretching	XVIII.
6864	Bryant, Mertoun C.	Pulleys, binder, for belts and brakes	XIII.
6283	Bryant, Patrick	Spikes, instrument for drawing	II.
6447	Bryant, Patrick, assignor to Elkanah Ring, Jr., & Thos. Ring	Hoops, cheese, &c., machines for cutting and slitting	XIV.
6136	Büchel, Christian W	Fire-arm, cartridge tube and conveyor, forming a repeating	XIX.
6440	Bucklin, Theodore G.	Castings preparing metallic patterns for	II.
6314	Buckman, Isaiah	Bedsteads for invalids	XVII
6598	Buell, Albert, and Thomas Brown	Smut machines	XIII.
6268	Bull, James H.	Gold washer, concentric centrifugal	II.
6503	Burckhardt, Christian	Fuel, consumption of, in steam boiler and other furnaces	V.
6792	Burden, Henry	Iron, machinery for drawing out and compressing heated	II.
	Burden, Henry	Shoes, horse	Extension.
	Burdge, Jonathan—see Converse and Burdge.		
6652	Burdick, Allen	Meat cutters	XVII.
6236	Burdick, Jason L.	Printing presses	XVIII.
6706	Burrel, Thomas and Edward	Straw cutters	I.
6822	Burt, Henry	Shingle machines, feed apparatus for	XIV.
6270	Burt, John	Doors, double hinged, water guard for	IX.
237	Burton, S. H.	Stoves	Design.
6492	Bush, Fenner, and Julius H. Pratt	Combs, ivory fine-tooth, making	XXI.
6238	Bushnell, Horace	Furnaces, air heating	V.
	Butler, Justus—see Bigelow and Butler		
6109	Call, Amos	Locks, door, by which one keyhole serves for two distinct keys	II.
6029	Callaghan, James	Dredging machines, method of directing the scoops in	IX.
6617	Callard, George	Lanterns, signal	V.

6044	Calvert, Francis A.	Wool, &c., manufacture of cylinders for burring	III.
6051	Calvert, Francis A.	Wool cleaning and lapping machine	III.
6662	Camp, Samuel H.	Tuyere, angular rotating	II.
6785	Campbell, Samuel.	Lapping machines	III.
6614	Caples, Charles.	Horse powers, equalizing the action of gearing in	XIII.
6566	Carlock, William B.	Bags and sacks, manufacture of	III.
6226	Carpenter, Emanuel W.	Plane irons, adjusting the position of, and regulating the throats of planes	XIV.
6286	Carpenter, John.	Tailors' measures	XXI.
	Carr, Charles—see R. B. Goodyer.		
	Cart, Edward—see Watson and Cart.		
6458	Carter, Chandler.	Boring and mortising machines	XIV.
6789	Carter, Charles P.	Apple parers	XVII.
	Carter, Harris and Carter—see Harris and Carter.		
6641	Carter, Ira Jr.	Presses, cheese, self acting	XII.
6156	Cary, Albigence W.	Pumps, rotary, packing for	XI.
6818	Cathcart, Andrew	Locomotives for ascending inclined planes	VI.
6119	Chaffee, Nelson E.	Drying machines	III.
6210	Chamberlain, Dexter H. assignor to William A. Dodge.	Wrench, sliding	II.
6261	Chamberlain, Dexter H. assignor to William A. Dodge.	Awl-haft	XVI.
6967	Chamberlin, Henry W.	Drawing boards	XVIII.
6612	Chambers, Benjamin	Fire-arms, moveable breeches for, and the locks and appurtenances for the same	XIX.
235	Chambers, George W. assignor to A. Cox & Co.	Stoves	Design.
236	Chambers, George W. assignor to A. Cox & Co.	Stoves	Design.
6583	Chandler, Thomas A.	Mills for grinding	XIII.
137	Chapin, Nathan	Churns, atmospheric	Reissue.
6755	Chapin, William A. Jr.	Lathes, varying the speed of the mandrel in	XIV.
6595	Chapman, Abner	Boiler flues, method of increasing the effective length of, and cleansing	VI.
6234	Chappell, Philip S. and William H.	Manures, artificial	I.
6378	Chase, John	Ox-yokes	I.
6106	Chase, Wesley	Fastening, opening and shutting blinds, method of	II.
	Chase, Wesley—see William T. Barnes.		
6125	Cheever, Levi T.	Fire kindling materials	V.
6326	Cherevoy, E. B.	Veneers, &c., machinery for cutting	XIV
6368	Chichester, Lewis S.	Staves, machinery for jointing	XIV.
6004	Chinnock, Charles.	Hubs and axles, connecting	X.
6387	Chollar, John B.	Stoves, plates for boiler holes and tops of	V.
6724	Christ, Abraham	Ploughs, land side	I.
6968	Christman, Charles G.	Flutes	XVIII.
6753	Clark, Charles.	Flax &c., machinery for spinning.	III.
6258	Clark, Ebenezer.	Saws	XIV.

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6001	Clark, Edward	Lamp black and colophane, manufacture of	IV.
6335	Clark, Edwin and James M	Flour, machinery for separating from bran, &c	XIII.
6114	Clark, F. H	Teeth, setting	XX.
	Clark, Jacob H.—see Touchstone and Clark.		
249	Clark, Samuel, assignor to Johnson and Cox	Stoves	Design.
250	Clark, Samuel, assignor to Johnson and Cox	Stoves	Design.
251	Clark, Samuel, assignor to Johnson and Cox	Stoves	Design.
6416	Clarke, Augustus	Chairs, easy	XVII.
6784	Clarke, William	Paper engines, bed plates for	III.
	Cline, William B.—see Hill and Cline.		
6764	Clinton, Thomas G., George H. Knight and Edward H. Knight	Churn dashers, adjustable	I.
6798	Clinton, Thos. G., Geo. H. Knight, and E. H. Knight	Stoves cooking	V.
6100	Cloud, Joseph C	Ploughs	I.
6446	Coad, Richard, assignor to Samuel G. Fisher	Combustion of fuel	V.
6501	Coats, Stephen	Plough, corn	I.
6089	Cobb, William	Stoves, cooking	V.
6660	Cochrane, James C	Fastener and stopper, self-acting, sash	II.
6653	Cochran, John W	Sawing ship timber, &c., mills for	XIV.
139	Coes, Loring	Screw wrenches	Re-issue.
6865	Coffeen, Goldsmith, Jr	Freezers, ice cream	IV.
6513	Coffin, Richard	Gates, railroad, machinery for operating by means of the locomotive	IX.
6142	Colburn, George F. I	Locks, door, protector slide for	II.
6520	Colby, George	Drill-barrows	I.
6824	Cole, James	Stoves	V.
	Cole, James—see Shields and Cole.		
6879	Cole, Luther	Scythe snaths	I.
31	Colt, Samuel	Fire-arms	Extension.
6577	Colver, Lewis W	Washing machines	XVII.
6726	Colver, Lewis W	Churn dashers, rotary	I.
6386	Colver, Nathaniel	Bedsteads	XVII.
6437	Conant, Jotham S	Sewing machines	III.
6026	Converse, A. T and William S. Cooley	Wheels, cast iron car	X.
6387	Converse, William F. and Jonathan Burdge	Bedsteads, machinery for cutting screws on rails for	XVII.
6029	Cook, James M	Wheels, cast iron car	X.

6121	Cook, Ransom	Ore separator, electro-magnetic	II.
	Cooley, William F.—see Converse and Cooley.		
	Cooper, Edward—see Scofield and Cooper.		
6842	Copeland, Charles W	Powder magazines, methods of flooding and entering	XIX.
6913	Copeland, Charles W	Valve, blow-off, of steam boilers, method of regulating the	VI.
6161	Corliss, George H	Gear, bevelled, machine for cutting teeth of	XIII.
6162	Corliss, George H	Valves, cut-off and working the, of steam engines	VI.
6603	Cornelius, Robt. and Chas. Welhelm, assignors to Robt. Cornelius and Isaac F. Baker	Lamp wick, elevator tubes for	V.
	Cornelius & Co.—see Isaac F. Baker.		
6033	Corser, Bliss	Clapboard machines	XIV.
6047	Cortlan, James	Baths, shower	XX.
	Cottle, Franklin D.—see Norton and Cottle.		
6237	Couch, Joseph J	Drilling rocks, machinery for	IX.
6457	Coult, Joseph C., and Augustus B. Davis	Churns, atmospheric	I.
	Cox, A. & Co.—see George W. Chambers.		
	Cox, David B.—see Johnson and Cox.		
6757	Cox, Green S	Composition for metallic packing in steam engines	IV.
6491	Cox, James, assignor to Jacob and John Pringle	Raising bricks, mortar, &c., extension machines for	XII.
6257	Cox, John J., and Samuel P	Water, raising and conveying	XI.
6683	Cox, Sam'l A., assignor to Matthias P. Sawyer & Jno. W. Hall	Railway chairs, machine for bending the lips of wrought iron	IX.
6880	Crafts, Ashley, and Ebenezer Weeks	Auger for boring earth	IX.
6918	Crafts, Ashley, and Ebenezer Weeks	Scraper, double revolving	IX.
6800	Crever, James A	Knobs, method of attaching to doors	II.
6804	Criswell, William	Horse collars, machines to manufacture	XVI.
6908	Croasdale, William	Plough and seed planter combined	I.
6354	Crocker, Samuel L	Nail, cut, from Muntz's metal	II.
6631	Cronk, Munson C	Bottles, cleansing	XXII.
6793	Crooker, Matthew A	Propellers, journals for oscillating	VII.
6922	Crosby, George—Camillus Kidder administrator of	File-cutting machines	II.
130	Crosby, Pearson	Saw-mills for re-sawing boards and other timber	Re-issue.
	Cross, J. and Son—see Samuel W. Gibbs.		
6233	Crum, John, and Abraham Larwill	Broom, splint, machines	XVII.
6263	Cumberland, John and William W	Compounds, lubricating	IV.
	Cummings, Perley D.—see Felton, Cummings and Hinckly.		
6040	Curtis, Lucius G	Telegraphs, indicating	VIII.
6866	Custer, Daniel	Drills, seed	I.
6559	Cutting, James A	Spark arresters	VI.
6014	Danforth, Charles	Drawing frames, stop motion for	III.
6259	Daniels, Reuben and Albert G. Dewey	Wool, &c., machinery for picking	III.
6495	Davies, Thomas A	Trap, and method of setting it	XXII.
	Davis, Augustus B.—see Coult and Davis.		
6680	Davis, Henry G	Supporters, spinal	XX.

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6471	Davis, Samuel W.	Marble, imitations of	XV.
6038	Davis, Wilbur M.	Boxes, machinery for making	XIV.
	Davis, Wm. C.—see Hosea H. Huntley.		
6623	Davison, Thomas	Meats, salting	IV.
6064	Day, Jacob G.	Trucks, R. R.	X.
6578	Day, Jacob G. assignor to John L. Kingsley	Bolt and rivet machine, rotating disk	II.
6143	Day, Lewis K. and Preston	Temples, weavers'	III.
6019	Dean, Linus and A. Higham	Wheels, cast iron car	X.
6198	Dearborn, John M.	Ranges, cooking	V.
6661	Decker, John	Freezers, ice cream	IV.
6867	Degen, Francis	Hat brims, curling	XXI.
6376	De Haven, John J.	Fire box, removable, for locomotives	VI.
6768	De Haven, John J.	Fire boxes of steam boilers, removable water lining for the	VI.
6151	Delano, Calvin	Rakes, horse	I.
6952	Dempsey, Robert M.	Bran dusters	XIII.
	Derrick, Wm. H.—see Spring and Derrick.		
6028	Devlan, Patrick S.	Compound, lubricating	IV.
6610	Devlan, Patrick S. assignor to G. S. Langdon	Boot-heels, metallic	XVI.
	Dewey, Albert G.—see Daniels and Dewey.		
6049	Dickey, Ebenezer J.	Planters, seed	I.
6516	Diehl, David	Planters, seed	I.
6291	Diehl, Hannah and Charles M.—administrators of Wm. Diehl deceased	Nail plate feeder	II.
6182	Dimpfel, Frederick P.	Smoke consuming apparatus	VI.
6675	Doan, George N.	Drilling machines, combined construction and operation of the drill in	IX.
6772	Doane, Calvin	Ovens, portable	V.
	Doane, Hammond—see Goodman and Doane.		
6435	Dodge, George H.	Yarn, apparatus for spooling	III.
	Dodge, William A.—see Dexter H. Chamberlain.		
6102	Doty, Cyrus B.	Bricks, coloring	XV.
6722	Doughty, J. H.	Privies, signal for	IX.
6585	Dow, C. C. (Miss or Mrs.)	Bonnets, pressing	XXI.
	Dow, James La—see La Dow, James.		
6496	Dow, Jesse E.	Tent-frames	XIX.

6970	Dow, Phinehas	Borer and elevator, earth	IX.
6609	Downer, Charles	Unloading carts, &c., apparatus for	XII
	Downs, Abel—see Birdsill Holly.		
6144	Draper, George	Temples, jaw, for looms	III.
6891	Dugard, Thomas	Saw mills, curvilinear	XIV.
6622	Dugdale, Joseph A	Bee-hives	I.
	Dunham, Coller and Sage—see Wm. L. Sanderson.		
6478	Dunham, Daniel	Stoves, cooking	V.
6493	Dutton, Carlton	Rail-road turn-out	IX.
	Dyer, Simon D.—see Bachelder and Dyer.		
6135	Dyson, Jeptha	Carding-engines	III.
6344	Eastman, Arthur M	Bobbins, driving	III.
6174	Eastman, Robt. assignor to Maria L. Eastman	Balances for weighing	XII.
6919	Eayrs, William	Stone dressing machines	XV.
6134	Eddy, James M., assignor to John Kimball	Turning irregular forms, machinery for	XIV.
6117	Edwards, William A	Pearl-ash, manufacture of	IV.
6727	Egbert, D. N	Churn dashers, rotary	I.
6371	Eldred, Allen	Hemp, &c., machinery for breaking and dressing	III.
6606	Eldred, Allen	Ploughs, hill-side	I.
6164	Elgar, John	Rail, two-part, tubular	IX.
154	Elgar, John	Canals, transportation on, and rail-roads*	Ext'n and Re-issue.
6393	Elgar, John and Benjamin Hallowell	Cradle, revolving, for unloading canal boats or sections thereof	IX.
6097 & 89	Ellicott, Ely and Samuel A. Abbott	Scale, lever, for canals, rail-roads, &c.	Addl. imp. and XII.
6401	Emerson, Richard H	Locomotive with driving axle above the boiler	VI.
6676	English, Michael	Gold washer	II.
129	Ericsson, John	Ships, propelling	Re-issue.
6255	Ericsson, John	Steam engine, an auxiliary, employment of, in combination with the condenser pump	VI.
6844	Ericsson, John	Engine, arrangement of, for using steam expansively	VI.
	Ericsson, John—see Forbes and Ericsson.		
6332	Essex, Jeremiah	Squares, carpenters', machine for making	XIV.
6746	Essex, Jeremiah	Baths, shower	XX.
6061	Evans, Evan Lewis	Stoves, cooking	V.
6591	Ewing, David L	Wheat-cleaning machines	I.
6827	Fagin, Lewis	Mills for grinding	XIII.
6169	Fairbanks, Thaddeus	Balances, double scale	XII.
6895	Fairbanks, Thaddeus	Scales, platform	XII.
6881	Falkman, Carl	Distilling and rectifying spirits	IV.
6192	Farrand, Jehial T	Water, apparatus for drawing from wells	XI.
6756	Farrand, Jehial T., and William Hinman	Water, machinery for raising from wells	XI.
6316	Faulkner, Augustus	Looms for weaving	III.
6813	Faulkner, Augustus	Looms	III.

* Extended and re-issued under the title of—"Boats, sectional, method of attaching to each other by means of a rule joint."

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
210	Fay, Henry C.	Stoves	Design.
6067	Feinour, Joseph.	Stoves, cooking	V.
6041	Felton, Horace, Perley D. Cummings, and Harington Hinckly	Wheels, cast iron plate car	X.
6907	Fenton, C. W.	Pottery ware, glazing	XV.
6323	Ferrell, William	Fastener, stopper, sash	II.
6664	Fife, Andrew.	Inkstands	XVIII.
6278	Fife, Matthew S.	Pens, metallic	XVIII.
6018	Filkins, John D.	Bog-cutters	I.
6657	Finch, Edward.	Wheels, car, manufacture of	X.
241	Finch, Edward B.	Stoves	Design.
6868	Finlay, James.	Regulators for water wheels, &c.	XIII.
6379	Finney, William C.	Cotton-scrapers	I.
6593	Fisher, Luther B.	Vegetables, cutting, crushing, and grinding	I.
6054	Fisher, M. and W. Martin, Jr.	Iron, cast, process for welding to wrought or steel	II.
	Fisher, Samuel G.—see Richard Coad.		
6569	Fisk, John W.	Winnowing machines	I.
6512	Fitch, Samuel S.	Braces, shoulder	XX.
6090	Fitzgerald, Jesse.	Cannon, sectional, bolt and disk	XIX.
6670	Fitzgerald, Jesse	Treenails, machinery for dressing	VII.
6688	Flack, John J	Axles of carriages	X.
6637	Flagg, Josiah F.	Spark arresters, locomotive, and smoke conductors	VI.
6042	Flagg, J. F. B.	Railroads, rails and wheels for turning curves of	IX.
5994	Flanders, Joseph F.	Shears, circular, and beading tool, combined	II.
6383	Fletcher, George, Sen.	Stone, machines for polishing	XV.
6194	Flint, Tilly and Warren.	Steelyards for weighing	XII.
6825	Folger, Andrew J.	Accounts, ledger, keeping	XVIII.
6802	Follet, Abner.	Bog-cutting machines	I.
6297	Forbes, Archibald H.	Bottle stopper, undetachable swinging	XXII.
6815	Forbes, Robert B., and John Ericsson.	Distilling sea water, apparatus for	IV.
6003	Forbush, Eliakim B.	Harvesting machines, form of teeth in	I.
6142	Ford, Mason H.	Carriages, railway, annunciators for	X.
6399	Foss, Cotton.	Grindstones, machines for making	XV.
6377	Foster, Charles.	Belts, rope, forks for holding upon drum wheels	XIII.
6608	Foster, Junius.	Hubs, connecting with axles	X.
6920	Foster, Samuel W.	Grain separators	I.

6450	Fountain, James L. and Henry K.	Harvesters	I.
	Fowler, John—see Henry Jones.		
6544	Francisco, Samuel P.	Churns, atmospheric	I.
6302	Franck, Theodore	Tables, extension	XVII.
	French, John M.—see Calvin Fulton.		
6148	Frost, Issachar, and James Monroe	Flour, machinery for separating from bran	XIII
6882	Frost, John W.	Brick, machines for moulding	XV.
	Fuller, Moses—see Brown and Fuller.		
234	Fulton, Calvin, assignor to John M. French	Stoves	Design.
6486	Fulton, George W.	Pumps	XI.
6826	Furley, William	Barrel carriages	XI.
6934	Gardner, Abel	Hames, apparatus for bending	XVI.
	Gardner, Charles J.—see Andrew Allen.		
6828	Garnsey, Ebenezer	Weather strip	IX.
	Garrison, Thos.—see Hopper and Garrison.		
6845	Garsed, Richard	Looms for weaving figured fabrics	III.
6668	Garside, Joseph and Henry J. Betjemann	Bedsteads, machinery for cutting screws in	XVII.
6368	Gatchel, Joshua L.	Rams, water	XI.
6393	Gay, David	Beer fountains, portable	IV.
6325	George, Ammi M. and Ephriam Brown, George assignor to Nathan and Davis Richards, Ebenezer Waterman and Aaron Tay, and D. Richards, E. Waterman and A. Tay, assignors to N. Richards, and *Brown* assignor to Lucius C. Alexander	Spike machine, revolving die	II.
6684	George, Dennis J. and Norman Millington	Squares, carpenters', graduating	XIV.
6070	Gerow, John L.	Stoves, cooking	V.
211	Gibbs, Samuel W. assignor to Jones and Finney	Stoves	Design.
222	Gibbs, Samuel W. assignor to Augustus Quackenboss	Stoves	Design.
240	Gibbs, Samuel W. assignor to J. Cross and Son	Stoves	Design.
226	Gibbs, Samuel W. assignor to North, Harrison & Co.	Stoves	Design.
6352	Gilbert, George	Staves, machinery for dressing	XIV.
6538	Gill, George E. and Joseph B. Tillinghast	Churns	I.
6692	Gilman, Alonzo, assignor to Wm. Johnson	Paper, machines for cutting	III.
6494	Gilmore, Arza	Bee hives	I.
6165	Goffin, Francis Charles	Lock, door, by a combined key and guage; also a thief detector	II.
6522	Goffin, Francis C. and Conrad Liebrich	Lock, pad	II.
	Goodell, Frederick—see Thos. W. Harvey.		
252	Goodhue, D. F. and Charles Guild	Stoves	Design.
6423	Goodman, Agdalena S.	Broom brushes	XVII.
6843	Goodman, Allen, and Hammond Doane	Lathes for turning	XIV.
156	Goodyear, Charles	India rubber, felting with cotton fibre	two re-issues on one patent.
157	Goodyear, Charles	India rubber, process for manufacture	
6786	Goodyear, Nelson	Suspenders, elastic cords for	XXI.

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6170	Goodyer, Robt. B, assignor to James A. Bowie and Charles Carr	Looms, apparatus for operating shuttle boxes of	III.
6571	Gore, Emory and Emerson	Wind mills	XI.
	Gould, Benjamin—see Joseph W. Webb.		
	Gould, Ezra—see Shaw and Gould.		
6068	Granger, R. D.	Stoves, cooking	V.
6069	Granger, R. D.	Stoves, cooking	V.
	Granger, R. D.—see Johnson and Cox.		
6046	Grant, William	Lathes, chucks for	XIV.
	Graverend, Raymond—see Pratt and Graverend.		
6601	Gray, A. N.	Whiffletree hook	X.
6223	Gray, James A.	Piano-fortes	XVIII.
	Gray, James H.—see Ed. N. Smith.		
6012	Green, Benjamin H.	Telegraph wires, painting	IX.
6801	Green, Thomas J.	Gold washers, rockers of	II.
6737	Greene, Jame D.	Boats, life, form of the air chambers of	VII.
6935	Greenwood, Asa	Clothes pins, machinery for turning	XVII.
6071	Grenville, Alonzo S.	Compound, lubricating	IV.
6120	Grice, Francis	Vessels, blocks for supporting bilges and keels of	VII.
6489	Griest, Gideon	Brakes for carriages	X.
6411	Gridley, Josiah A.	Churn dashers	I.
6123	Grinnell, Samuel H.	Rakes, horse	I.
	Guild, Charles—see Goodhue and Guild.		
6441	Guild, Martin	Ropes, machinery for laying	III.
6796	Haile, Ashbel B.	Hemorrhage, instruments for arresting from internal organs or cavities	XX.
6245	Haines, Jonathan	Harvesting machines	I.
6403	Haines, William M.	Calculating machines	VIII.
6479	Halbert, Horace	Stoves, cooking	V.
6777	Hall, Alexander	Churns	I.
6655 & 152	Hall, Edward and Joseph L.	Fire proof safes	V. & Re-issue.
6079 & 151	Hall, John S.	Mill for rolling irregular shapes by means of a cam pattern	II. & Re-issue.
	Hall, John W.—see Samuel A. Cox.		
6425	Hall, Lewis A.	Trusses	XX.
	Hallowell, Benjamin—see Elgar and Hallowell.		

	Halsey, Job F.—see Andrews and Halsey.		
219	Haney, Abram, assignor to J. A. Morrison	Stoves	Design.
221	Haney, Abram, assignor to Morrison and Tibbits	Stoves	Design.
248	Haney, Abram, assignor to Morrison and Tibbits	Stoves	Design.
6076	Harbach, Frederick	Furnace, multiple grate for locomotive boilers	VI.
6735	Harwick, Peter W	Fruit, paring and coring	I.
	Hargitt, Godfrey—see Waldran and Hargitt.		
30	Harley, James	Casting chilled cylinders and cones	Extension.
6241	Harmon, Emanuel	Pictures, shading by metallic leaves	XVIII.
	Harper, Benjamin—see John W. Hoffman.		
	Harris, Conrad—see Lamb and Harris.		
6846	Harris, Daniel K. and John K	Mowing machines	I.
6847	Harris, D. W. and E. P. Carter, assignors to Carter, Harris and Carter	Corn shellers	XIII.
6027	Harris, Ephraim	Tuyere, blacksmiths' rotary	II.
	Harris, William R.—see Holton and Harris.		
6971	Hart, Carmi	Wheels, cast iron car	X.
6269	Hart, Carmi and Nathan Washburn	Wheels, cast iron car	X.
6936	Hartley, Lewis M	Lock, double bolt trick	II.
6869	Hartshorne, Charles and William B. Shaw	Lasts, machinery for turning right and left	XVI.
	Hartshorn, Charles—see Webber and Hartshorn		
6871	Hartung, Charles, assignor to J. B. Klein	Fire arm, safety sliding breech	XIX.
6736	Hartzhorn, Sheldon S	Buckles, suspender	XXI.
6537	Harvey, Thomas W. assignor to Frederick Goodell	Lock, gun, rotating tumbler	XIX.
6529	Haslett, Lewis P	Inhalers, or lung protectors	XX.
6754	Hatch, Warren D	Cars, couplings for	X.
6334	Hatfield, Robert G. and Oliver P	Railway propeller	X.
90	Hathaway, Benj. G. H	Thrashing machines	Additional Improv.
6380	Hatheway, Gilbert	Saw mills with cylindrical saws	XIV.
6077	Hay, Adam	Wrench, hinged claw	II.
6758	Hayden, Daniel W	Carding machines	III.
6635	Hayden, Josiah and Rufus Hyde	Button moulds, manufacture of	XXI.
6229	Hayden, Whiting	Guides for warpers	III.
6063	Hayes, John P	Baking apparatus	V.
6201	Hayes, John P	Furnaces, portable hot air	V.
6432	Hedge, Lemuel	Saw-mills	XIV.
	Heeringen, E rnest Von—see Von Heeringen.		
	Helm, John—see Tyer and Helm.		
6183	Herries, William	Grain gatherers	I.
6710	Hershey, Isaac S	Hides, machines for breaking	XVI
6505	Heygel, Joseph	Smut machines	XIII
6782	Hewet, Henry W	Propellers, reciprocating	VII.
6790	Hibbard, Harmon	Tanning leather by tannin and acids	XVI.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6388	Hibbard, William C.	Hemp, machinery for spinning	III.
6025	Hibbert, James	Knitting needles	III.
	Hicks, Coleman—see Peck and Hicks.		
6429	Hicks, William C.	Rail-way switches, method of operating	IX.
6152	Higgins, John and Hiram H.	Cloth, machinery for dressing and folding	III.
	Higham, A.—see Dean and Higham.		
6110	Hill, Asa, and Samuel G. Blackman.	Teeth, compositions for filling	XX.
253	Hill, Samuel, and William B. Cline	Stoves	Desgin.
228	Hill, Samuel, and William B. Cline	Stoves	Desigu.
6646	Hills, Edwin	Steam-tables	IV.
	Hinckly, Harington—see Fulton, Cummings and Hinckly.		
6972	Hinkley, Benjamin	Bedsteads	XVII.
	Hinman, William—see Farrand and Hinman.		
6475	Hinton, John	Harvesters of clover heads	I.
	Hitchcock, James R.—see Southworth and Hitchcock.		
	Hitchcock, Wm. R. & Co.—see Peter Kirkham.		
6690	Hobbs, Alfred C. and John Brown.	Ice, machine for crushing	XXII.
6762	Hodge, Nehemiah	Brakes for cars. mode of operating	X.
6412	Hodgman, Daniel and Amos D. Wyckoff.	Mats, &c., machinery for making	III.
6299	Hoffman, John M.	Centre-board, folding	VII.
6584	Hoffman, John W.	Stopper, sash, spring and tackle	II.
6548	Hoffman, John W. assignor to Lewis B. Kelly and Benj. Harper	Railroad track, lever to be placed on a, and acted upon by the wheels of cars or locomotives	IX.
6921	Hoffman, John W. assignor to Henry A. Landry	Frog for railroad	IX.
	Holland, William—see Homer and Holland.		
6337	Hollingsworth, J. M. assignor to J. M. and L. Hollingsworth	Paper, machinery for taking and laying from the cutting engine	III.
6500	Holly, Birdsill, assignor to Abel Downs, Edward Mynderse, Horace C. Silsby and Washburn Race	Pumps	XI.
6094	Holly, Henry W.	Music stands	XVIII.
6691	Holton, Simeon Jr. and William R. Harris.	Looms, machines for weaving harness for	III.
6336	Honey, Joseph S.	Cultivator teeth	I.
6338	Hood, John W.	Trusses	XX.
6905	Hopkins, Charles	Account books, blank	XVIII.
6430	Hopkins, John	Brewing and preserving alcoholic drinks	IV.

6892	Hopkins, Stevens D.	Gates, flood, for fences	IX.
5996	Hopper, Thomas, and Thomas Garrison	Journals and boxes	X.
6733	Horn, Edwin B.	Lock, door	II.
6103	Horn, Edwin B.	Lamps, camphine	V.
6770	Horner, Eli R., and William Holland	Boot-crimps	XVI.
6342	Horst, Charles	Piano-fortes	XVIII.
	Horton, H. B.—see Blodget and Horton.		
6178	Hotchkiss, Andrew	Curry-combs	II.
6592	Hotchkiss, Andrew	Ox-yoke fastenings	I.
6369	Hotchkiss, David, and Benjamin R. Norton	Spectacle glasses	VIII.
6202	Houghton, Harvey—Lucretia Houghton, administratrix of	Bell telegraph	II.
6674	Hovey, Simeon	Bedstead fastenings	XVII.
6251	Howard, John C.	Steam engines, rotary	VI.
	Howe, Elias, Jr.—see Reed and Howe.		
6848	Howell, A. J.	Winnowing machines	I.
6321	Hoyt, William	Locomotives, cog gearing of, for ascending inclined planes	VI.
6353	Hubbard, Herbert R., and George W.	Supporters, abdominal	XX.
6384	Hubbs, Paul K.	Filtering apparatus for steamboat boilers	VI.
6389	Huff, Samuel	Churns	I.
	Hughes, Daniel—see John Wright.		
	Hughes, Stephen—see Learned and Hughes.		
6006	Hunt, Adoniram F. and James S. Bradish	Musical instruments	XVIII.
6281	Hunt, Walter, assignor to William and John Richardson	Pins, dress	XXI.
6663	Hunt, Walter, assignor to George A. Arrowsmith	Gun, combined piston breech and firing cock repeating	XIX.
6147	Hunter, Stephen R. and Mead Merrill	Hubbs and axles, manufacture of	X.
6131	Huntington, Samuel	Lasts, &c., machinery for turning right and left from the same pattern	XVI.
244	Huntley, Hosea H.	Stoves	Design.
257	Huntley, Hosea H., assignor to W. C. Davis	Stoves	Design.
6498	Hutchinson, Charles B.	Wind-mills	XI.
6155	Hüttmann, George A. W. and George Koch Kornelio	Fire-escapes	XXII.
6276	Hyde, Hiram T.	Springs, carriage	X.
	Hyde, P. L.—see Amos W. Snow.		
	Hyde, Rufus—see Hayden and Hyde.		
6373	Irving, Epidaurus	Tanning by electricity	XVI.
6358	Isbister, Caleb	Stoves, coal, grates for	V.
6760	Isham, Norman M. and Erastus E. Marcy	Steel, process of making	II.
6240	Ives, Joseph	Lancets, spring	XX.
6073	Jack, Samuel, 2d	Drilling machine, combined spring rock	IX.
6213	Jackson, Israel	Carriage bodies, hanging	X.
6390	Jacques, L. Aimable Prosper	Musquito bars, frame for	XVII.
6037	Jeffery, Edwin A.	Pump pistons, packing	XI.
6106	Jenkins, Henry	Fences, wire	IX.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6938	Jenks, Alfred	Drawing heads, mode of changing the gearing of, while in motion	III.
6763	Jenks, Lemuel P.	Gold washers, arrangements of the conductors in centrifugal	II.
6716	Jenney, Franklin	Shingles, machinery for dressing	XIV.
6410	Jennings, Lewis	Gold washer	II.
6973	Jennings, Lewis, assignor to George A. Arrowsmith	Fire-arms, breech-loading	XIX.
6267	Jennison, William H	Gold washer	II.
6408	Jennison, William H.	Filtering diaphragm, self-regulating	XI.
6829	Jeter, Hugh, assignor to Jeter and Watson	Planing machines	XIV.
238	Jewett, Sherman S. and S. H. Root	Stoves	Design.
6293	Jewett, William S.	Brushes, shaving	XXI.
6685	Jobes, Samuel	Staves, machinery for jointing	XIV.
6910	Johnson, A. and H.	Cocks, stop, and filters, in combination	XI.
	Johnson and Cox—see Samuel Clark.		
138	Johnson, Elias, and David B. Cox, assignors to R. D. Granger	Stoves, cooking	Re-issue.
6288	Johnson, James H.	Lancet, spring	XX.
6207	Johnson, Job	Fish-hook, spring snap	XXII
	Johnson, Joseph B.—see Morey and Johnson.		
6175	Johnson, William J.	Presses, cotton	XII.
	Johnson, William—see Alonzo Gilman.		
6700	Johnston, David	Stoves, cooking	V.
6188	Johnston, John, and John D. Snyder	Cloth, apparatus for dressing	III.
6366	Johnston, Joseph.	Flour, machinery for separating from bran	XIII.
6915	Jones, Daniel, Jr.	Bells, fog, method of ringing, and an adjustable clapper for the same	VII.
	Jones and Finney—see Samuel W. Gibbs.		
6418	Jones, Henry, assignor to John Fowler	Bread making, preparation of flour for	XVII.
	Jones, Henry C.—see Henry Ritchie.		
6883	Jordan, Elijah	Ink fountains	XVIII.
6166	Joslin, William.	Rope machinery	III.
6721	Kaighn, Elias.	Stoves, cooking	V.
6814	Karney, John.	Bedsteads, invalid	XVII.
	Keane, James and Thomas—see C. R. Tisdale and Keanes.		
6695	Keen, Samuel, Jr.	Welts, machines for cutting	XVI.
6870	Kellogg, John.	Hubs, connecting to axles	X.

	Kelsey, Melville—see William Berry.		
	Kendall, Amos—see Livingston, Roggen, Adams, Kendall, and Vail.		
6277	Kendall, Stephen	Punching machine	II.
6313	Kendall, Thomas	Drilling, sub-marine rock, apparatus for	IX.
6382	Kepler, Israel	Corn shellers	XIII.
6467	Kershaw, Edward	Keyhole protector	II.
	Ketchum, D. O.—see George Scott.		
	Kidder, Camillus—see George Crosby.		
	Kimball, John—see James M. Eddy.		
6140	King, Julius	Nuts and bolt-heads, machine for dressing	II.
6209	King, Julius	Cut-off, adjustable	VI.
6574	King, Thomas	Washing machines	XVII.
6799	Kingsland, Cornelius	Grate bars	V.
	Kingsley, John L.—see Jacob G. Day.		
6830	Kinman, Nathan	Packers, flour	XII.
6659	Kirby, Josiah	Treenail machine	VII.
6953	Kirkham, Peter, assignor to Wm. R. Hitchcock & Co.	Buttons, manufacture of	XXI.
6651	Kirkham, Peter, assignor to Wm. R. Hitchcock & Co.	Buttons, covered	XXI.
	Klein, J. B.—see Charles Hartung.		
6904	Knapp, Cyrus	Milking cows, instruments for	I.
	Knight, Geo. H. and Ed. H—see Clinton and Knights.		
6524	Knight, Isaac	Trucks for railroad cars	X.
	Knights, Henry G.—see Bolles and Knights.		
6370	Knowles, Hazard, assignor to John Levy	Tonguing and grooving, cutters for	XIV.
6039	Knowles, Hazard	Mill bushes	XIII.
6294	Knowles, Hazard, assignor to John Levy	Planing machines	XIV.
6738	Knowles, Hazard	Veneering, cauls for	XIV.
	Kornello, George Koch—see Hüttmann and Kornelio.		
6954	Krauser, Samuel	Harvesters, clover	I.
6586	Krechler, Charles A	Distilling apparatus	IV.
	Kuemerle, Martin—see Schomacker and Kuemerle.		
6771	Lacharme, Louis	Gold Washers	II.
6613	La Dow, James	Boots and shoes, machines for pegging	XVI.
6473	Laird, Joshua	Knobs, shank for mineral door	II.
229	Lamb, Joseph G., and Conrad Harris	Stoves	Design.
254	Lamb, Joseph G., and Conrad Harris	Stoves	Design.
	Landry, Henry A.—see John W. Hoffman.		
	Langdon, G. S.—see Devlan and Langdon.		
5993	Larrabee, Ephraim	Baths, shower	XX
	Larwill, Abraham—see Crum and Larwill.		

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6301	Laubereau, Francis Joseph	Engine, air	XI.
6406	Laurence, Henry	Teeth, artificial	XX.
6443	Law, Hervey	Staves, machinery for dressing	XIV.
6309	Law, Hervey	Planing machines	XIV.
212	Lawson, Peter	Carpets	Design.
213	Lawson, Peter	Carpets	Design.
214	Lawson, Peter	Carpets	Design.
6189	Lawton, H. B., and H. T.	Cotton batting	III.
5999	Layman, Jesse	Ploughs	I.
6463	Layton, William Y	Gins, cotton	III.
6902	Learned, Charles, and Stephen Hughes	Flour, machinery for dressing	XIII.
6085	Learned, Elijah	Hoisting apparatus	XII.
6831	Leavenworth, Lucius	Fences	IX.
6775	Leffel, James	Stoves, cooking	V.
5998	Leland, Abner	Ploughs, combined	I.
6074	Lent, Charles A.	Buckles, suspender, machine for making	XXI.
	Leonard, Francis—see John Wright.		
6723	Leonard, George, Jr.	Fire-arm with several stationary barrels and a revolving hammer	XIX.
	Lerow, John A.—see Blodgett and Lerow.		
6884	Leslie, Frank	Table and bedstead, combined	XVII.
6348	Levington, Robert	Boxes for R. R. cars	X.
	Levy, John—see Hazard Knowles.		
6730	Lewis, H. L. B.	Cars, couplings for	X.
	Lewis, Joseph—see Mac Lardy and Lewis.		
6819	Lewis, William, and William H.	Daguerreotype plates, apparatus for holding	XVIII.
6431	Lewis, William, and William H.	Daguerreotype apparatus for gilding plates	XVIII.
	Liebrich, Conrad—see Goffin and Liebrich.		
6832	Lightbown, Roger	Looms, power	III.
6811	Lighthall, William A.	Steam engines, arrangment of the lever half beam of	VI.
6872	Lillie, Lewis	Locks, means of changing the combination of revolving tumbler	II.
6469	Lincoln, Abraham	Vessels, method of lifting over shoals	VII.
6130	Lindsay, William H.	Fluid metre	VI.
6749	Linhart, Adam, and Samuel McClain	Grain carriers, construction of	I.
6594	Linikin, Abner T	Lounge and chair combined	XVII.

6409 & 88..	Livingston, L. R., John Jay Roggen and Calvin Adams.....	Lock, right or left hand	II. & Addt. Impt.
6779	Livingston, L. R., J. J. Roggen, Calvin Adams, Amos Kendall, and Alfred Vail	Telegraph wires, supporters for.....	.....VIII.
6341	Lloyd, Charles C.....	Blast generators.....	.....XI.
6422	Lockett, Thomas.....	Sausage machines.....	.....XVII.
6367	Loper, R. F.....	Boilers, arrangement of flues in marine.....	.....VI.
6673	Loper, R. F.....	Engine, method of working the air pump and using a condensing as a non-condensing.....	.....VI.
	Lord, James L.—see Augur and Lord.		
6833	Lotze, Adolphus.....	Stoves	.....V.
6315	Low, Joseph J.....	Spectacle frames.....	..... VIII.
6045	Luter, Elisha	Shingle and stave-dressing machines	.....XIV.
6955	Lyman, Azel S.....	Alarm for indicating want of water in boilers	.....VI.
6704	Lyon, David W.....	Hinges, machine for forming the eyes of.....	.....II.
6572	Mac Lardy, William, and Joseph Lewis.....	Spindles, live, and fliers.....	.....III.
6000	Macomber, Arunah S.	Turning.....	.....XIV.
6672	Macomber, David O.	Pens, fountain.....	.....XVIII.
6242	Mallerd, Samuel.....	Dyeing.....	.....IV.
6172	Mallow, Henry.....	Forebays, regulating.....	.....XI.
6540	Mann, Jacob J., and Henry F.	Harvesting machines, grain carriers for.....	.....I.
6742	Mann, Samuel.....	Presses, cheese, self acting.....	..... XII.
	Mann, William E.—see Van Bunschoten, Woodbridge and Mann.		
6560	Manny, Pells.....	Harvesters.....	.....I.
	Marcy, Erastus E.—see Isham and Marcy.		
6834	Marsh, David, and Eli B. Nichols.....	Mills for grinding.....	.....XIII.
6939	Marshall, Moses.....	Looms for weaving figured fabrics.....	.....III.
6514	Marston, William W.....	Lock, gun.....	.....XIX.
6534	Martin Ebenezer F.....	Stoves, cooking	.....V.
6681	Martin, James W., and Edwin Parry.....	Chucks	.....XIV.
	Martin, W. Jr.—see Fisher and Martin.		
6849	Mascher, J. F.....	Regulators.....	..... XIII.
6774	Maskell, Thomas	Centre-board, keel.....	..... VII.
133	Mason, George L.....	Wool and cotton, preparing for carding.....	....Re-issue.
6638	Mason, Nicholas	Stoves, cooking.....	.....V.
6923	Mason, Nicholas.....	Ranges, cooking.....	.....V.
6322	Massey, John	Driers, grain, endless bands for.....	.....V.
6573	Massey, William.....	Bands, wrought iron, machine for contracting the circumference of.....	.....II.
6773	Masterson, William G.....	Water wheels.....	.....XI.

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6290	Mathews, Benjamin S.	Leather, skiving	XVI.
6787	Mathews, Hannibal	Stoves, cooking	V.
	Matlack, John A.—see Radebaugh and Matlack.		
6116	Matthew, David	Spark and gas consumers	VI.
6206	Matthewson, Erastus C.	Railroad switches, self-adjusting	IX.
6160	Maxim, Marcus	Spike machine	II.
6378	McAulay, Malcom	Gins, cotton	III.
6462	McCammon, William	Cut-off, disk, acted upon and regulated by the governor	VI.
6003	McCarty, James	Skelps, from which iron tubes are made, method of bending	II.
6956	McCarty, James	Tube, combined lap and butt welded	XI.
6539	McCarty, John	Carding machines	III.
6187	McCleary, Andrew	Spark arrester, spiral	VI.
6747	McCleary, Samuel, and John Pierce	Maps, making dissected	XVIII.
6141	McComb, David	Presses	XII.
6017	McCulley, Joseph	Skelps, tube, dies for bending	II.
6588	McDonough, Abraham	Bedsteads, portable cot	XVII.
6329	McEvoy, Henry, assignor to W. Benjamin, Jr.	Hooks and eyes for ladies' dresses	XXI.
6355	McFarlan, Amos B.	Brakes, carriage	X.
6173	McGinley, John	Boots and shoes, spring shanks for	XVI.
6324	McKay, Gordon	Cut-off, piston valve	VI.
6108	McKinney, Almeron, and David Tyler	Presses, cheese, self-acting	XII.
	McClain Samuel—see Linhart & McClain.		
6023	Mellish, Henry	Braces, body	XX.
	Melvin, Thomas M.—see Pedrick and Melvin.		
6957	Meritt, Isaac	Gates, folding	IX.
	Merrick, Solyman	Wrenches, screw	Extension.
	Merrick, Solyman—see Bartholomew and Merrick.		
	Merrill, Mead—see Hunter and Merrill.		
6264	Merritt, Frederick S.	Ranges, cooking	V.
6898	Merryman, Elias H.	Butter-working machines	I.
6282	Meyer, Conrad	Piano-fortes, elevating the tops of	XVIII.
6698	Miles, C. M.	Engines, method of reversing reacting rotary	VI.
6810	Miller, Benjamin F.	Stairs, construction of iron	IX.
6630	Miller, Henry	Bedstead fastenings	XVII.
134	Miller, Hezekiah S.	Felt fabrics, &c., machinery for making	Re-issue.

6050	Miller, Jacob C.	Planters, seed	I.
	Millington, Norman—see George and Millington.		
6139	Minesinger, David	Fire-arms, detached metallic cartridge tube, &c., for	XIX.
	Minkler, Simeon—see Pollard and Minkler.		
	Minturn, Charles—see Watson and Cart.		
6413	Mix, William	Spoons, method of making wire-strengthened	II.
6974	Moat, William C.	Pistons and stuffing boxes, tubular packing for	VI.
6734	Moffitt, Alexander	Winnowing machines, motion of riddles in	I.
	Monroe, James—see Frost and Monroe.		
6113	Montgilion, Louis	Railroads, apparatus for removing animals from	IX.
6445	Montgomery, William, assignor to Wm. Montgomery and George H. Williams	Rope yarns, tarring	III.
6036	Moore, Emery N.	Post marking letters, &c., machinery for	XXII.
	Moore, Luther Henry—see Adams and Moore.		
6099	Morey, Charles, and Joseph B. Johnson	Sewing machines	III.
6176	Morison, Benjamin	Rope machinery	III.
6549	Morris, Edmund	Door holder	II.
6725	Morrison, Enoch R.	Shingles, machinery for riving and dressing	XIV.
	Morrison, J. and A.—see Abram Haney.		
	Morrison and Tibbits—see Abram Haney.		
6420	Morse, Samuel F. B.	Telegraphs, electric	VIII.
6530	Mott, Jordan L.	Stoves, cooking	V.
	Mott, Jordan L.	Stoves	Extension.
6940	Moulton, John	Bedstead fastenings	XVII.
	Mower, Samuel—see Woodworth and Mower.		
6419	Mowry, Charles	Staves, machinery for jointing and cutting	XIV.
	Mowry, James D.—see Amos W. Snow.		
6975	Moyer, J. W.	Trucks, railroad	X.
6128	Mulbury, James	Valves, short slide, by chamfering the corners	VI.
6621	Mulhern, Justin	Water, &c., apparatus for filtering	XI.
6526	Mumma, Jacob	Corn shellers	XIII.
6885	Mumma, Jacob	Drills, seed	I.
6941	Munden, Isaac	Hubs, machinery for preparing for boxes	X.
6707	Munger, Asa, and Royal C. Taylor	Knives, machine for polishing	XVII.
6639	Munson, Edmund	Mill stones, forming and balancing	XIII.
5995	Munson, R. D.	Hubs and axles, attaching and detaching	X.
6426	Munson, Sylvester, and William H. Pratt	Washing machines	XVII.
6133	Murdock, Charles	Churns	I.
6523	Murdock, Reuben	Barrel machinery	XIV.
6633	Murphy, John	Wheels, car, method of regulating the contraction of	X.
6924	Murray, George E.	Teeth, making artificial	XX.
6112	Muzzy, Jacob	Saw-set, nipper	XIV.
6542	Myers, Emanuel	Planters, seed	I.

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6159	Myers, Jeremiah	Looms, let off motion of	III.
	Mynderse, Edward—see Birdsill Holly.		
6193	Myrick, Freeman F	Water wheels, tide	XI.
6065	Nettleton, Alpheus	Cars, dumping	X.
	Nichols, Eli B.—see Marsh and Nichols.		
6665	Nichols, John C	Tables, dining	XVII.
6942	Nichols, William E	Cord, machinery for making	III.
6636	Niles, Peter H	Lock, eccentric piano	II.
6374	Norris, Curtis E	Bobbins, machinery for boring	III.
6943	North, Gibson	Boilers, tin, for cooking stoves with cast iron bottoms, making	V.
	North, Harrison & Co.—see Samuel W. Gibbs.		
	Norton, Benjamin R.—see Hotchkiss and Norton.		
	Norton, Horace—see Moses S. Salter.		
6137	Norton, James L	Stoves, cooking	V.
6015	Norton, Presbery and Franklin D. Cottle	Saws, machine for filing	XIV.
6732	Nowell, Foster	Spinning jack	III.
	Noyes, Charles W.—see Allen and Noyes.		
	Noyes, William C.—see Thomas G. Boone.		
6372	O'Conner, William, administrator of the estate of Henri Menceau de Villeneuve, deceased	Wool, producing a substitute for, from jute	III.
6362	Olmstead, Adolphus	Galvanic batteries	VIII.
6686	O'Neil, Patrick	Mattresses, spring	XVII.
6011	Osgood, Enoch	Tooth extractors	XX.
6265	Ostrander Jonathan F	Bullets or pills, machine for spherifying	XIX.
6225	Otis, Benjamin H	Presses, cheese, self-acting	XII.
6546	Owen, Benson	Stoves, self-regulating dampers for	V.
6944	Owen, J. Parsons	Bedstead fastenings	XVII.
6696	Page, Lewis B	Fastener, sash, eccentric	II.
6752	Paine, Henry M	Copying presses, portable	XVIII.
6536	Palmer, Aaron	Drills, grain	I.
6122	Palmer, Benjamin F	Legs, artificial	XX.
6055	Park, Jesse K. and Cornelius S. Watson, assignors to William W. Rose	Envelopes, machines for making	XVIII.
6239	Parker, Granville	Steamboat, canal	VII.
6551	Parker, Warren	Rakes, horse, harness adapted to	I.

6105	Parkhurst, Stephen K.....	Gun, cotton.....	.....III.
	Parry, Edwin—see Martin and Parry.		
6308	Parry, Harrison.....	Gold washer, rotary.....	..... II.
6805	Parry, John C.....	Casting chilled rolls, method of giving a rotary motion to the melted iron in.....	.....II.
6016	Partridge, R. F.....	Planters, corn.....	..... I.
6260	Pasco, Sardius and Elihu Perry.....	Boot crimps.....	.....XVI.
6914	Patch, John.....	Propellers.....	.....VII.
6550	Patten, Joseph H.....	Drying grain.....	.....V.
6958	Patterson, Robert.....	Flax and hemp, manufacture of.....	.....III.
6271	Pease, Dan, Jr.....	Hulling machines.....	.....I.
6289	Pease, Dan, Jr.....	Hulling machines.....	.....I.
153	Pease, Francis S.....	Harvesting machines.....	..... Re-issue.
	Pease, Keeney and Gage—see W. L. Sanderson.		
6925	Pecare, Jacob and Josiah M. Smith.....	Fire-arms, concealed trigger for.....	..... XIX.
6392	Peck, Charles H. and Coleman Hicks.....	Planing machines.....	.....XIV.
209	Peck, N. P.....	Stoves.....	..... Design.
6084	Pedrick, William and Thomas M. Melvin.....	Hemp, machinery for spinning.....	.....III.
6088	Peeler, Henry.....	Gun barrels, method of boring.....	.....XIX.
6976	Peirson, Jacob.....	Planters, seed.....	..... I.
6059	Pelton, A. S.....	Hinge, combined, fastener and shutter opener.....	.....II.
149	Pennock, Moses and Samuel.....	Seed planters.....	.....Re-issue.
6561	Perkins, Thatcher, assignor to Levi B. Tyng.....	Boilers and water-heaters of locomotive engines.....	.....VI.
6480	Perley, Charles.....	Winch, direct and counter motion.....	.....XII.
6509	Perley, Charles, and Joshua Terry.....	Shank painter stopper.....	.....VII.
6873	Perley, Charles.....	Windlasses, method of fitting the heaving socket and head of.....	.....XII.
6945	Perry, Alonzo D.....	Guns, faucet breech.....	.....XIX.
	Perry, Elihu—see Pasco and Perry.		
6618	Peters, William.....	Carpets, machines to beat and brush.....	..... XVII.
6580	Philips, David.....	Sawmills, circular.....	.....XIV.
6145	Pierce, Amaria.....	Gas apparatus.....	..... V.
	Pierce, John—see McCleary and Pierce.		
6517	Platt, Nelson.....	Harvesters.....	.....I.
	Poinier, J. W.—see Moses S. Salter.		
6224	Polhameus, Abraham G.....	Saddle and winch, combination of adjustable.....	..... VII.
6385	Pollard, Abiathar, and Simeon Minkler.....	Supporters, obstetrical.....	..... XX.
6654	Pomeroy, Elisha M.....	Buttons, manufacture of, from straw-board.....	..... XXI.
243	Pond, Moses.....	Stove, air-tight.....	..... Design.
	Poole, Henry W.—see Alley and Poole.		
6850	Pope, Charles.....	Hames, harness.....	..... XVI.
6217	Porter, Robert D.....	Tuyeres, conical valve in.....	.....II.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS
6589	Porter, Rufus, assignor to Richard Van Dyke, Jr.	Engines, auxiliary, arrangement and method of working the valves of, for feeding boilers	VI.
6453	Post, Jacob	Lock for fire-arms	XIX.
	Pouley, William—see Rhoades and Pouley.		
6436	Powers, Rufus	Lumber, machinery for working into irregular forms	XIV.
6926	Powell, Samuel W.	Mills for grinding	XIII.
6215	Pratt, Daniel R.	Springs for carriages, &c.	X.
6149	Pratt, Elijah, and Raymond Graverend	Telegraph wires, suspending	IX.
	Pratt, Julius H.—see Bush and Pratt.		
6647	Pratt, Samuel	Metallic plates, method of uniting to each other	II.
6168	Pratt, T. W.	Spark arrester, horizontal	VI.
	Pratt, William H.—see Munson and Pratt.		
6356	Prescott, Joseph W., assignor to A. and A. J. Prescott	Musical instruments	XVIII.
	Pringle, Jacob and John—see James Cox.		
6781	Pritchett, Jacob	Ore washers	II.
6360	Prosser, Thomas	Boilers, tool for attaching tubes to	VI.
6421	Prouty, David O., and Ezra Whitman	Corn-shellers	XIII.
6476	Purviance, Alfred J.	Harvesting machines	I.
6184	Pye, Sylvester M.	Lock, door	II.
	Quackenboss, Augustus—see Samuel W. Gibbs.		
6163	Quinn, Henry	Drying grain	V.
6129	Race, Washburn, assignor to L. S. Bacon	Stoves, self-acting registers for	V.
	Race, Washburn—see Birdsill Holley.		
6331	Radebaugh, John, and John A. Matlack	Hair, machinery for cleaning	III.
220	Ransom, Samuel H.	Stoves	Design.
224	Ransom, Samuel H.	Stoves	Design.
225	Ransom, Samuel H.	Stoves	Design.
245	Rathbone, John F.	Stoves	Design.
246	Rathbone, John F.	Stoves	Design.
247	Rathbone, John F.	Stoves	Design.
6808	Ray, Elias M.	Latch bolt, spring	II.
6231	Ray, Fowler M.	Springs, caoutchouc	X.
6714	Read, John B.	Pumps for raising water	XI.
6048	Read, Philip Pitts	Ox-shoe machine roller, with moveable dies	II.

6748	Reed, Cheney, and Elias Howe, Jr	Blinds, apparatus for opening and closing	II.
6507	Reed, Jesse	Steering apparatus	VII.
6395	Reed, Knight	Sugar, boiling	IV.
6138	Reichert, Henry	Fences, flood	IX.
	Reynolds, Edward	Felloes, &c., bending for carriage wheels	Extension.
6797	Reynolds, Joseph	Looms for figured fabrics	III.
6472	Rhoades, Jeremiah, and William Pouley	Saddles, spring	XVI.
6835	Rice, Orrin	Wash-boards	XVII.
6611	Rich, John	Ploughs	I.
6250	Richards, J. Avery, and John W. Wolcott	Diving bells, deep sea	VII.
	Richards, Nathan and Davis—see George and Brown.		
6319	Richardson, Israel J	Straw-cutters	I.
6320	Richardson, Israel J	Corn-shellers	XIII.
6232	Richardson, Israel J	Threshing and grain-separating machines	I.
	Richardson, William and John—see Walter Hunt.		
231	Richmond, Apollos, assignor to A. C. Barstow & Co	Grate, portable	Design.
6007	Richter, William	Ploughs	I.
6317	Riley, George	Distilling apparatus	IV
	Ring, Elkanah, Jr., and Thomas Ring—see Patrick Bryant.		
6510	Ripley, Ezra	Chills for casting rasps, files, &c	II.
6669	Ripley, Edwin G., administrator of the estate of Edwin Wesson	Fire-arm, method of connecting the hammer with the cylinder of a revolving	XIX.
6252	Ritchie, Henry, assignor to Henry C. Jones	Locks, bank	II.
6555	Ritchie, Henry, assignor to Henry C. Jones	Lock, rotating permutation plate	II.
6553	Robb, Daniel	Ploughs, hill-side	I.
6689	Robbins, Horace T	Brakes for railroad cars	X.
6556	Robbins, Zenas C	Churns	I.
6629	Robinson, Jonathan H	Pessaries	XX.
6893	Robson, John A	Bedsteads, sofa	XVII.
6082	Roebling, John A	Wire ropes, tops for	II.
6481	Rogers, Charles	Shoes, machines for cutting welts for	XVI.
6037	Rogers, David B	Cultivators	I
6901	Rogers, John F	Trucks, railroad	X
6761	Rogers, S. W	Valve, foot, of steam engines	VI.
	Roggen, John Jay—see Livingston, Roggen, and Adams.		
	Roggen, John Jay—see Livingston, Roggen, Adams, Kendall, and Vail.		
6347	Rollf, Robert B	Fasteners, curvilinear, blind opener and shutter	II.
6715	Rollhaus, Philip	Ranges, cooking	V.
6349	Roney, B. T	Stoves, cooking	V.
	Root, F. H.—see Jewett and Root.		

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6482	Ropes, David N.	Cutlery, table, method of attaching the tang to the handle of.	XVII.
	Rose, William W.—see Park and Watson.		
6616	Ross, James P.	Steam engine, rotary, valves of.	VI.
6743	Ross, James P.	Planters, seed.	I.
5997	Ross, Joseph.	Bridge, swinging.	IX.
6836	Ross, William A.	Sails, means for working.	VII.
6127	Roth, Valentine.	Brick-presses.	XV.
6072	Ruggles, James.	Vinegar, manufacture of.	IV.
6468	Ruthven, Morris W.	Propelling vessels by reaction.	VII.
6190	Sabin, Harvey W. and Luther B. Benton.	Water-buckets, apparatus for raising and tilting.	XI.
6946	Sabin, Harvey W.	Water, apparatus for drawing from wells.	XI.
6947	Safford, Albert G.	Car couplings, self-acting.	X.
6886	Salter, Moses S. assignor to Moses S. Salter, Horace Norton and J. W. Poinier.	Iron, malleable, process for making direct from the ore.	II.
6852	Sampson, Elnathan.	Balances, pendulum.	XII.
6887	Sampson, Elnathan, and A. M. Billings.	Hubs, connecting with axles.	X.
6275	Sanborn, John D.	Bedstead fastenings.	XVII.
128	Sanburn, Abraham.	Bee-hives.	Re-issue.
6545	Sanders, Benjamin D.	Winnowing machines.	I.
230	Sanderson, William L. assignor to Pease, Keeney and Gage.	Stoves.	Design.
255	Sanderson, William L. assignor to Dunham, Coller and Sage.	Stoves.	Design.
6221	Sanford, Nathaniel C.	Auger, combined convex and concave.	XIV.
6305	Sanford, Nathaniel C. and Lucius B. Smith.	Augers, screw, machine for regulating the twist and diameter of	XIV.
6570	Sanger, Ebenezer C.	Mules, self-acting regulators for.	III.
6959	Sangster, Hugh.	Lanterns, signal.	V.
6778	Sargent, Charles G.	Burring cylinders.	III.
6200	Satterlee, Edward.	Metals, process for burnishing.	II.
239	Savery, William.	Stoves.	Design.
6474	Sawyer, David.	Scythe nibs.	I.
	Sawyer, Matthias P. and John W. Hall—see Samuel A. Cox.		
6874	Sawyer, Sylvanus.	Rattans, machinery for splitting and dressing.	XXII.
6311	Scarlett, William.	Buckles, suspender, machine for making.	XXI.
6053	Schnebly, William and Thomas.	Boat, life, self-inflating and folding.	VII.
6697	Schomacker, J. H. and Martin Kuemerle.	Books, machines for turning the leaves of.	XVIII.

6506	Scott, James	Sundials	VIII.
6414	Scowden, Theodore R.	Water main s, valve seats, &c. for	XI.
6449	Scudder, Charles K.	Chimney caps	V.
6132	Secor, James	Current wheels, apparatus for	XI.
6581	Seely, Samuel J.	Life-preserving hammock, arrangement of the sections in a	VII.
6563	Serrell, James E. and David Smith	Press, centripetal	XII.
6104	Sewell, William Jr.	Boilers, steam, apparatus for ascertaining by inspection the saltness of water in	VI.
6788	Seyler, Benjamin	Ploughs	I.
6171	Seymour, Alfred B.	Rail-road bar, combined	IX.
6750	Seymour, Pierpont	Drills, grain, devices for sowing seed in	I.
6470	Seymour, William H.	Staves, machines for jointing	XIV.
6960	Sharps, Christian	Fire-arms, method of revolving the hammer of repeating	XIX.
6246	Shaw, Jacob Jr.	Spectacle frames	VIII.
6095	Shaw, Philander	Boot-heels, cutting	XVI.
	Shaw, William B.—see Hartshorne and Shaw.		
256	Shaw, William F.	Girandoles	Design.
6404	Shaw, William M. and Ezra Gould, Gould assignor to Shaw	Printing paper hangings	XVIII.
6877	Sheldon, John	Chronometers for longitude	VIII.
6339	Sheldon, Job, and John S. Barden	Planing machines	XIV.
6912	Shepard, Timothy	Barrel heads, machinery for dressing	XIV.
6557	Sherborne, Thomas P.	Tables, extension	XVII.
6032	Sheriff, John	Cocks, stop, for hot water and steam	XI.
6853	Sherman, John W.	Planters, seed	I.
6156	Shields, James, and James Cole	Stoves for heating apartments	V.
6284	Shipton, Thomas N.	Threshing machines	I.
6894	Sibert, Lorenzo	Furnace, blast, combination of a double travelling hearth with a	II.
6624	Sickel, Horatio G.	Lamps, gas	V.
	Silsby, Horace C.—see Birdsill Holly.		
6020	Sinclear, Heman B.	Ploughs	I.
6310	Singer, Isaac M.	Carving wood or metal, machine for	XIV.
6875	Slawson, Charles	Leather dressing machines	XVI.
6228	Small, Johnston	Corn-shellers	XIII.
6854	Smart, John M.	Axles, grease boxes for	X.
6405	Smith, Abijah, assignor to Gilead A. Smith	Trusses	XX.
6346	Smith, Alpheus D.	Ram, water	XI.
6888	Smith, Augustine	Hemp-brakes	III.

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6194	Smith, Daniel	Rifles, attachment of loading muzzle for	XIX.
6410	Smith, David	Shot, drop, mothod of manufacturing	XIX.
	Smith, David—see Serrell and Smith.		
6272	Smith, David M	Lock, bank	II.
6896	Smith, Edward N. assignor to James H. Gray	Paper, machines for molding	XVIII.
6452	Smith, Homer	Grain separators	I.
6343	Smith, Hezekiah B	Mortising machines	XIV.
6248	Smith, Jesper	Water-wheels, re-action	XI.
6247	Smith, J. Cutts	Baby-tenders, locomotive	XVII.
	Smith, Josiah M.—see Pecare and Smith.		
6488	Smith, Lorenzo	Gates	IX.
	Smith, Lucius B.—see Sanford and Smith.		
6795	Smith, Newman W	Accoucheurs' chairs	XX.
6682	Smith, Robert	Saddles, spring seat	XVI.
6837	Smith, Robert, and Alexader Bain	Telegraphs, electro-chemical	VIII.
6300	Snell, William	Boots, machines for cutting gaiter	XVI.
6552	Snow, Amos W. assignor to James D. Mowry and P. L. Hyde.	Cars, rail-road, seats for	X.
	Snyder, John D.—see Johnston and Snyder.		
6212	Solliday, Daniel H	Gas burners	V.
6075	Sourbeer, John	Fences, flood	IX.
6720	Sours, William	Stoves, cooking	V.
6851	Southworth, D. H., and James R. Hitchcock	Hullers, rice	I.
6199	Spangenberg, John	Sugars, draining and blanching	IV.
6219	Spangenberg, John	Clarification of cane juices	IV.
	Sparkman, James D.—see William Berry.		
6249	Spring, Charles A., and William H. Derick	Planing machines	XIV.
6605	Springsteed, R. H	Planters, seed	I.
6179	Sprouse, William T	Ploughs	I.
6807	Stafford, James R	Stoves, cooking	V.
6009	Stanley, John B	Pea vines, machines for gathering	I.
6961	Stanton, Henry	Churn dashers	I.
6363	Starr, Eben T	Boats, flexible, divisions between the tubes of	VII.
6098	Start, William H	Wagons, dumping	X.
6497	Stoacy, Edward	Drills, grain	I.

6765	Stewart, William B.	Wash-boards, machines for making	XVII.
6519	Stillman, Alfred	Sugar, boiling, steam pipes for	IV.
6671	Stillman, Alfred	Sugar pans	IV.
6150	Stinehart, William, and John Taggart.	Brakes for cars	X.
6927	Stiven, Alexander	Pumps for raising water	XI.
6296	Stockwell, Lewis	Shingles, machinery for dressing	XIV.
6483	Stotlemeyer, Devolt	Bedstead fastenings	XVII.
6767	Stow, Dennis S	Sawing, mitre, machinery for	XIV.
6597	Straub, Abraham	Winnowing machines	I.
6562	Stroop, Jacob	Ploughs, attachment of harrows to	I.
6587	Stroop, Jacob	Fastener, window shutter	II.
6243	Sturgis, John J	Type-casting machines	XVIII.
6838	Sullivan, Jonathan	Straw-cutters	I.
6656	Swain, Benjamin O	Planetariums	VIII.
6889	Swan, Richard, Jr	Piano-fortes, sounding boards for	XVIII.
6906	Sweeney, Peter	Pumps, rotary	XI.
6690	Swett, Samuel	Spark arresters, deflectors for	VI.
6783	Tabele, William	Bandboxes, manufacture of	XXI.
6052	Taft, Andrew B.	Hinge and spring, combined double	II.
	Taggart, John—see Stinehart and Taggart.		
6525	Taplin, John A	Horse powers, construction of the master wheel of	XIII.
6859	Tarr, John B.	Engines, fire	XI.
	Tay, Aaron—see George and Brown.		
	Taylor, Fowler P.—see Joseph W. Briggs.		
6687	Taylor, James	Bedstead fastenings	XVII.
	Taylor, Royal C.—see Munger and Taylor.		
	Terry, Joshua—see Perley and Terry.		
6640	Tewksbury, George P	Boat, life, reversible	VII.
6596	Thatcher, Thomas	Pump valves, and their arrangement	XI.
6554	Thomas, James	Trap, animal, adjustable platform	XXII.
6717	Thomas, James	Brooms, machine for making	XVII.
135	Thomas, John	Docks, floating dry	Re-issue.
6839	Thomas, William S	Springs for carriages	X.
6962	Thompson, Henry G	Engines, rotary, valve motion cut-off, and steam stops	VI.
6667	Throckmorton, Reid R.	Planing machines	XIV.
6677	Thurman, John W.	Ploughs, hill-side	I.
148	Thurston, John	Winnowing machines	Re-issue.
6205	Tiffany, Oliver	Furnaces, air-heating	V.
6154	Tilden, Richard S.	Punching machine, with a combination of adjustable gauge s.	II.

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
	Tillinghast, Joseph B.—see Gill and Tillinghast.		
6285	Titcomb, Stephen	Bee-hives	I.
6590	Tisdale, Charles R., James Keane and Thomas Keane, James and Thomas Keane, assignors to Charles R. Tisdale	Cotton, machinery for spinning	III.
6477	Todd, Hiram	Buckles for harness	XVI.
6751	Torrey, Ambrose	Waste gate or sluice, self-acting	IX.
6318	Touchstone, James, and Jacob H. Clark	Pistons, metallic, method of expanding	VI.
6643	Townsend, Benjamin M	Road scrapers	IX.
	Townsend, Benjamin M.—see Woodruff and Townsend.		
6398	Toy, Joseph M. assignor to David Bonner	Sawing wood, machinery for	XIV.
132	Trapp, William Jr.	Barrel machinery	Re-issue.
6273	Treadwell, Leverett	Brakes for rail-road cars	X.
6021	Treadwell, William B.	Wheels, cast iron car	X.
6115	Trees, James	Water wheels	XI.
6359	Tremper, John	Piston ring, and method of deriving motion therefrom in rotary engines	VI.
6030	Truscott, Samuel	Wheels, cast iron car	X.
6890	Tucker John E.	Welt-cutting and splitting machines	XVI.
6678	Tupper, Lewis	Straw-cutters	I.
6091	Tuthill, Thomas J.	Ploughs, rotary cutter	I.
6060 & 136.	Tuttle, Charles F.	Furnaces, registers for hot air	V. & Re-issue.
6708	Tuttle, Charles F.	Furnaces, registers for hot air	V.
6840	Tuttle, John L.	Cylinders, toothed, mode of making	III.
6632	Twitchell, Willard	Gates, arrangement of weight and pulley for closing	IX.
6066 & 141.	Tyer, H. G. and John Helm	India-rubber, manufacture of	IV. & Re-issue.
	Tyler, David—see McKinney and Tyler.		
	Tyng, Levi B.—see Thatcher Perkins.		
	Vail, Alfred—see Livingston, Roggen, Adams, Kendall and Vail.		
6218	Van Anden, William	Screw cutting machine, feeder and nippers for	II.
6634	Van Anden, William	Springs, spiral, machine for making of wire	II.
6357	Van Bunschoten, Isaac, John J. Woodbridge and William E. Mann; Woodbridge and Mann, assignors to Van Bunschoten	Daguerreotype apparatus for panoramic views	XVIII.
6086	Vance, Elisha	Stoves, cooking	V.

	Van Dyke, Richard Jr.—see Rufus Porter.		
6415	Van Kuran, Isaac	Wheels, cast iron car	X.
6841	Van Ness, William J	Callipers, transverse	VIII.
6928	Van Riper, Garret	Hemp, machinery for spinning	III.
6948	Vaughan, David	Staves, machinery for jointing	XIV.
6949	Vaughan, Joseph Jr	Tools, machine for grinding and polishing	XIV.
6929	Verdat du, Trembley, Jean Baptiste Louis Prosper	Engines, vapor, condensers and stuffing boxes of	IV.
	Villeneuve, Henri Meneau de—see William O'Conner.		
6528	Von Heeringen, Ernest	Musical notation	XVIII.
6558	Von Heeringen, Ernest	Piano forte, instruments for teaching music with the	XVIII.
6791	Von Schmidt, Peter	Ore-washers	II.
	Vose, Samuel D.—see Bleecker and Vose.		
232	Wager, James	Stoves	Design.
233	Wager, James	Stoves	Design.
242	Wager, James	Stoves	Design.
6582	Waldran, William B. and Godfrey Hargitt	Brick presses	XV.
6626	Walker, Andrew, Jr	Gas apparatus	V.
6644	Walker, Charles	Hullers, rice	I.
6208	Walker, Charles, and George Willson	Veneers, manufacture of paper	XIV.
6532	Walker, Daniel L	Washing machines	XVII.
6705	Walley, Samuel S	Pawls, jointed	XIII.
6977	Ward, Isaac B	Wheels for carriages	X.
6713	Ward, William	Horse powers	XIII.
6177	Waring, George E	Stoves, cooking	V.
217	Waring, George E	Stoves	Design.
6008	Warner, Benjamin W	Shears, tailors'	XXI.
6013	Warner, Chapman	Cores, moulding and compressing	II.
6428	Warner, Chapman	Pipes, lugs and links for connecting	XI.
6527	Warner, Chapman	Churns	I.
6515	Warner, George E	Boom-derrick	XII.
6167	Warner, Jeremiah	Cultivators	I.
223	Warnich, Charles W	Stoves	Design.
6620	Warren, Jesse	Ploughs	I.
6740	Warren, Thomas E	Chairs, springs for	XVII.
	Washburn, Nathan—see Hart and Washburn.		
	Waterman, Ebenezer—see George and Brown.		
6978	Waterman, Nathaniel	Lanterns, portable	V.
	Watson, Cornelius S.—see Park and Watson, assignors to William W. Rose.		
6729	Watson, John, and Edward Cart, assignors to Albert Woodhull and Charles Minturn	Gas generators	IV.
6434	Watson, William	Grain, destroying weevil in	I.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6438	Weatherhead, David L.	Bolt machines, method of constructing and operating the header in	II.
6625	Webb, John G.	Lamps, gas, argand burners for	V.
6448	Webb, Joseph W. assignor to Benjamin Gould	Cut off and steam stop of rotary engines	VI.
6253	Webber, Elbridge, and Charles Hartshorn	Lasts, &c., machinery for turning	XVI.
6702	Webber, George	Can-hooks	XII.
6433	Webster, Francis M.	Bedsteads for invalids and others	XVII.
6619	Weed, Julius	Apples, paring, coring and slicing	XVII.
	Weeks, Ebenezer—see Crafts and Weeks.		
6350	Weeks, John J.	Mortising machines	XIV.
6541	Weishampel, John F.	Grates, coal, revolving horizontal	V.
	Welhelm, Charles—see Cornelius and Welhelm.		
6195	Wells, Thomas J. assignor to Daniel Barnum	Planing machines	XIV.
	Wells, Thomas J.—see Barnum and Wells.		
6855	Wentworth, Joseph	Carpet cleaning machine	XVII.
	Wesson, Edwin—see Edwin G. Ripley.		
6266	Wheaton, Milow S.	Dam or water weir, adjustable	IX.
6615	Wheeler, Asa	Metals, process of hardening	II.
6576	Wheeler, George	Bee-hives	I.
6719	Wheeler, William	Stoves, cooking	V.
6056	Whipple, John A.	Daguerreotype pictures, taking	XVIII.
140	Whipple, Milton D.	Wool, machine for cleaning from burs and other foreign matter and also for ginning cotton	Re-issue.
6911	Whipple, Milton D., assignor to The Bay State Mills	Fringe, shawl, machinery for twisting	III.
6381	Whistler, John	Lasts, shoe	XVI.
6666	White, Edwin B.	Spike machines, rotating	II.
6803	White, Edwin B.	Spike machine, double cylinder	II.
6081	White, James	Stoves, cooking	V.
6454	White, Jonathan	Straw-cutters	I.
6083	Whiteside, G. B.	Stoves, cooking	V.
6856	Whitham, James M.	Tailors' measures	XXI.
	Whitman, Ezra—see Prouty and Whitman.		
6118	Whitmarsh, Samuel	Warming apartments, apparatus for	V.
6645	Wilder, William S.	Ruling paper, machines for	XVIII.

6979	Wiley, John	Boring window sash, machinery for	XIV.
6484	Willcox, William H.	Boring machines	XIV.
6701	Williams, Abijah J.	Heddles, wire, machinery for making	III.
	Williams, George H.—see William Montgomery.		
6504 & 91	Willoughby, James D.	Planters, seed	I. and adt'l imp.
6857	Willoughby, James D.	Water, apparatus for raising and carrying	XI.
6950	Wills, Harry A.	Spike machines, operating the hammers of	II.
	Willson, George—see Walker and Willson.		
6287	Wilson, Charles	Stone, machines for dressing	XV.
6776	Wilson, Charles.	Presses for cotton, &c., hydraulic	XII.
6487	Wilson, John.	Looms	III.
6547	Wilson, Roswell	Stoves, cooking	V.
6203	Winegar, Caleb	Telegraphs, magnetic	VIII.
6306	Winne, Simon P.	Valve, sliding cut-off	VI.
6963	Winslow, Isaac	Bottle fasteners	XXII.
6930	Wiser, Hiram H.	Wheels, cast iron car	X.
	Wolcott, John W.—see Richards and Wolcott.		
	Wood, Simeon—see Beardsley and Wood.		
6345	Wood, Thomas R.	Coffee roaster	XVII.
	Woodbridge, John J.—see Van Bunschoten, Woodbridge and Mann.		
6235	Woodbury, Daniel.	Grain separators	I.
6211	Woodbury, Joseph P.	Planing machines	XIV.
	Woodhull, Albert—see Watson and Cart.		
6858	Woodruff, Jerome B., and Benjamin M. Townsend	File supporter	XIV.
6427	Woods, Lucius B.	Railroad switch, self-acting	IX.
6394	Woodward, Francis G.	Railroad switches, method of fastening	IX.
6375	Woodward, Mary Ann	Chairs, fan rocking	XVII.
6899	Woodward, Arad 3d, and Samuel Mower	Brick presses	XV.
218	Woolson, Charles J.	Stoves	Design.
6931	Worster, Alvah	Buckle tongues, detachable	XVI.
6397	Worster, J. Rutherford	Diving bells	VII.
6274	Worthington, Henry R., and William H. Baker	Engines, method of insuring the action of the valves in the direct action pumping	VI.
6037	Wright, Alexander	Burring machines, guards or strippers for	III.
6031	Wright, Henry.	Boot trees	XVI.
6216	Wright, John, assignor to Francis Leonard and Daniel Hughes	Lock, s, machine for turning on sheet metal	II.
6980	Wright, Lemuel W.	Rotting hemp and other fibrous materials, apparatus and process for	IV.
6146	Wright, William	Pistons, metallic packing for	VI.
6711	Wright, William M.	Churn-dashers, atmospheric	I.

ALPHABETICAL LIST—CONTINUED.

NUMBER.	PATENTEES.	INVENTIONS OR DISCOVERIES.	CLASS.
6709	Würdemann, William	Parallatic instruments for measuring distances	VIII.
6964	Wurflein, Andrew	Lock, turning nipple and concealed hammer	XIX.
	Wyckoff, Amos D.—see Hodgman and Wyckoff.		
6111	Yale, Linus	Lock, combination revolving tumbler	II.
6214	Yerger, George W	Fractured or injured ankles, surgical apparatus for	XX.
6602	Young, Samuel S.	Calculating machines	VIII.
6876	Zisemann, Ferdinand	Brick presses	XV.

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TABLES:

EXHIBITING THE COMPARATIVE NUMBERS OF PATENTS, OF EACH CLASS, ISSUED TO CITIZENS OF THE SEVERAL STATES FOR EVERY TEN YEARS,

FROM 1790 TO JANUARY, 1850;

TO WHICH IS ADDED

A LIST OF PATENTS GRANTED TO FOREIGNERS DURING THE SAME PERIOD.

MAINE.*

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.....	Agriculture, including instruments and operations	.....	.....	 2	24	76	14
2.....	Metallurgy and manufactures of metals, and instruments therefor	.....	.....	.....	 7	10	 7
3.....	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	.....	.....	 2	 8	13	 3
4.....	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c	.....	.....	.....	 3	 7	 3
5.....	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	.....	 1	.....	 1	29	 3
6.....	Steam and gas engines, including and boilers furnaces therefor, and parts thereof	.....	.....	 1	.....	 4	 1
7.....	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life preservers	.....	.....	.....	 3	 7	 6
8.....	Mathematical, philosophical and optical instruments, including clocks, chronometers	.....	.....	.....	.....	 4	 1
9.....	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams and other internal improvements, buildings, roofs	.....	.....	.....	 2	 5	 1
10.....	Land conveyance, comprising, carriages, cars and other vehicles used on roads, and parts thereof	.....	.....	.....	 1	11	 2
11.....	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids	.....	.....	.....	 3	24	 6
12.....	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights	.....	.....	.....	12	13	 7
13.....	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers	.....	.....	.....	12	20	 8
14.....	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	.....	.....	.....	13	15	11
15.....	Stone and clay manufactures, including machines for pottery, glass making. brick making, dressing and preparing stone, cements and other building materials	.....	.....	.....	19	16	 1
16.....	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	.....	.....	 1	 1	10	 3
17.....	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	.....	 1	 1	 3	26	 6
18.....	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	.....	.....	.....	 1	.....	.....
19.....	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	.....	.....	.....	 4	 3	.....
20.....	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	.....	.....	 1	 1	 3	 1
21.....	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing	.....	.....	.....	 1	 2	 1
22.....	Miscellaneous	.....	.....	.....	 1	 2	 1
	Total	.....	 2	 8	...120	.. 300	86

* Where patents have been granted to joint inventors residing in different states, the invention is accredited to the state first named in the official digest.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations	1	2	6	7	23	8
2.	Metallurgy and manfactures of metals, and instruments therefor		3	4	3	16	6
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	1	2	13	5	11	10
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	1	4	3		5	3
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel			5	4	25	3
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	2	1	3	1	2	2
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers		1	3	1	2	1
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers			2			1
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams and other internal improvements, buildings, roofs		2	2		2	6
10.	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof	1		2	1	4	3
11.	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids	3	1	3	2	11	7
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights		1			6	9
13.	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers		2	2	1	8	2
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements			5	3	41	11
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements and other building materials			1	1	1	2
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness		2	4	4	6	1
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	1	2		3	7	5
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry			1		1	4
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder		1	2	1	2	
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus			2			6
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing					2	1
22.	Miscellaneous					1	2
	Total	10	24	63	37	176	93

VERMONT.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.*
1.	Agriculture, including instruments and operations	2	2	5	11	20	14
2.	Metallurgy and manufactures of metals, and instruments therefor	1	1	3	5	8	12
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	1	2	12	5	22	21
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	2	1	3	3	2	
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparing of fuel	1		3	6	12	15
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof				2		6
7.	Navigation and maritime instruments, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers				1		3
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers			1	3	3	
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs			3	1		1
10.	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof		1		3	6	4
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids	2	2	2	5	4	4
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights		1	4		14	8
13.	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers		1	1	1	7	7
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements		3	3	5	8	16
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements and other building materials		1	1	2	2	3
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness		2	3	1	10	3
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing			1	3	5	
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry			4	2	2	1
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder					5	
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus				2	2	2
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						1
22.	Miscellaneous						
	Total	9	17	49	61	132	121

* 1 Design; 1 Re-issue.

MASSACHUSETTS.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800	1810.	1820.	1830.	1840.	1850.*
1.....	Agriculture, including instruments and operations,.....	 2	 7	24	14	39	24
2.....	Metallurgy and manufacture of metals, and instruments therefor.....	 7	22	54	27	82	88
3.....	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper.....	 5	11	58	66	...123	...137
4.....	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.....	11	18	29	15	35	16
5.....	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel.....	 3	10	27	17	74	96
6.....	Steam and gas engines, including boilers and furnaces therefor, and parts thereof.....	 1	 1	 6	 6	24	21
7.....	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers.....	 3	 2	17	20	29	25
8.....	Mathematical, philosophical, and optical instruments, including clocks, chronometers.....	.....	10	 4	 4	 7	15
9.....	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs.....	 5	 8	 4	 9	13	39
10.....	Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof.....	.....	 6	 8	 8	18	40
11.....	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids.....	 3	12	84	17	34	24
12.....	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising and moving weights.	 1	 6	 8	 3	12	10
13.....	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers.....	 1	 4	 6	10	16	10
14.....	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements.....	 2	13	19	30	52	49
15.....	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials.....	 1	 4	 7	 8	 7	19
16.....	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness.....	 2	14	18	15	47	32
17.....	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing.....	 2	 8	 3	14	34	31
18.....	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry.....	 1	 3	11	14	29	47
19.....	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder..	.....	 3	 5	 2	21	11
20.....	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus.....	.....	 2	 1	 1	 5	21
21.....	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing.....	.....	 1	 7	 7	 9	12
22.....	Miscellaneous.....	.....	.....	.....	 1	 4	21
	Total.....	50	...165	...350	...308	...714	...784

* Re-issues, 13: designs, 13: renewals, 1: extensions, 1: additional improvements, 1.

RHODE ISLAND.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800	1810.	1820.	1830.	1840.	1850.*
1.	Agriculture, including instruments and operations				3	4	3
2.	Metallurgy and manufacture of metals, and instruments therefor	1	1	1	3	7	12
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	2	1	24	27	37	15
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.						
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel		1	5	1	6	7
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof				4	2	7
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers		1		2		
8.	Mathematical, philosophical, and optical instruments, including clocks, chronometers				3	2	1
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs		1	1	3	2	4
10.	Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof				3	1	1
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids	2	1	1	3	1	
12.	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising and moving weights					1	3
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers			1		4	1
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements		1			5	
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials						
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness			1	1	2	
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing			1		2	3
18.	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry		1	3	1	1	2
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder					1	1
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus				2	1	
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing		2	1	3		1
22.	Miscellaneous						
	Total	5	10	39	59	79	61

* Re-issues, 1; designs, 2.

CONNECTICUT.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.*
1.....	Agriculture, including instruments and operations.....	.....	12	23	30	37	26
2.....	Metallurgy and manufactures of metals, and instruments therefor.....	 8	 9	15	11	43	59
3.....	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper.....	 1	12	38	28	56	30
4.....	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.....	 8	10	18	 7	 9	14
5.....	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel.....	.....	 6	14	 8	66	20
6.....	Steam and gas engines, including boilers and furnaces therefor, and parts thereof.....	.....	.....	 3	 1	10	 9
7.....	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers.....	 2	 4	 3	 5	 7	 6
8.....	Mathematical, philosophical and optical instruments, including clocks, chronometers.....	 1	 3	 4	12	10	10
9.....	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs.....	 1	 2	 2	11	 6	 9
10.....	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof.....	.....	10	 4	16	11	14
11.....	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids.....	 2	 9	 6	 9	 9	 8
12.....	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights..	.....	 4	 2	 4	 6	 4
13.....	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers.....	.....	 7	 9	 5	18	 9
14.....	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements.....	.....	 5	18	14	23	22
15.....	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials.....	.....	 3	 1	 1	 2	 1
16.....	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness.....	.....	 1	 7	 4	17	 4
17.....	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing.....	 1	 7	 5	10	30	20
18.....	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry.....	 2	 3	 6	 6	 5	 9
19.....	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder...	.....	.....	 3	 3	 9	 8
20.....	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus.....	 1	.....	.....	.....	 3	12
21.....	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing.....	 2	 6	18	 8	19	19
22.....	Miscellaneous.....	 1	.....	.....	 5	 3	15
	Total.....	30	...113	...199	...183	...399	...328

* Re-issues, 9; extension, 1; design, 1.

NEW YORK.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.*
1.	Agriculture, including instruments and operations	.....	34	47	...138	...211	...181
2.	Metallurgy and manufactures of metals, and instruments therefor	 3	21	30	55	...133	...176
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	 4	20	86	...130	78	95
4.	Chemical processes, manufactures and compounds, including, medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	 4	29	65	68	...114	77
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	 3	 9	56	55	...169	...273
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	 1	 4	20	44	63	...118
7.	Navigation and maratime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers	 3	 9	39	35	59	67
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers	.....	 1	 7	 5	22	35
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs	.....	 7	10	54	73	73
10.	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof	 1	 4	17	23	58	62
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids	 8	24	47	59	...103	...123
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights	.....	10	14	18	44	43
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers	 2	 7	16	38	83	60
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	 3	 8	22	58	...141	95
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials	 5	 5	 5	22	29	13
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	.....	 2	13	17	44	62
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	 1	24	22	48	79	65
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	 1	 5	19	30	48	71
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	.....	 1	 5	16	20	35
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	.....	 2	 4	14	22	46
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing	.....	 3	 5	17	22	37
22.	Miscellaneous	 1	 4	 7	 7	11	32
	Total	40	...233	...556	...951	. 1,626	. 1,839

* Extended, 2; disclaimers, 4; re-issues, 27; designs, 101; renewals, 3; additional improvement, 1.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.*
1.	Agriculture, including instruments and operations	3	16	17	35	122	105
2.	Metallurgy and manufactures of metals, and instruments therefor	8	4	32	17	64	96
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	8	10	29	26	37	27
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	9	36	43	26	45	42
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	7	10	21	28	43	83
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof		2	6	9	58	59
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers	9	5	14	7	36	31
8.	Mathematical, philosophical, and optical instruments, including clocks, chronometers	3	2	5	5	7	11
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs	2	2	7	14	35	38
10.	Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof		2	6	12	47	42
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids	5	15	23	22	31	40
12.	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights		2	8	3	12	14
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers	4	6	20	7	44	33
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements		8	9	14	30	33
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials	2	1	8	10	26	22
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	1	4	10	16	26	31
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	1	6	13	16	31	30
18.	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry		4	13	15	27	38
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	1	4	5	6	10	9
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	1	3	4	1	16	22
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing		1	11	8	12	15
22.	Miscellaneous	1	1	1	3	8	18
	Total	65	144	307	300	767	839

* Additional improvements, 5; re-issues, 5; designs, 16; extension, 1.

NEW JERSEY.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.*
1.....	Agriculture, including instruments and operations	1	5	2	13	26	14
2.....	Metallurgy and manufactures of metals, and instruments therefor	2	2	5	2	12	37
3.....	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	3	3	11	10	13	26
4.....	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	1	6	9	7	7	8
5.....	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel		3	2	4	9	15
6.....	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	2		8	3	4	15
7.....	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers	1	4	8	3	3	6
8.....	Mathematical, philosophical, and optical instruments, including clocks, chronometers		1	1	2	1	2
9.....	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs			1	6	5	6
10.....	Land conveyances, comprising carriages, cars, and other vehicles used on roads, and parts thereof		4	1	3	8	7
11.....	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids	5	4	2		10	6
12.....	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights			1	2	2	4
13.....	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers		1	2	2	2	3
14.....	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	1		4	3	5	5
15.....	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials	2		2	2	2	2
16.....	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness		2		5	5	6
17.....	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing		1	1	3	2	3
18.....	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	2		4	1	3	2
19.....	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder			1	1	1	2
20.....	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus					3	5
21.....	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing		1			4	9
22.....	Miscellaneous		1	1		1	5
	Total	19	38	66	72	128	188

* Renewals, 31; re-issues, 41; design, 1.

DELAWARE.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1890 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations		1	1	2	5	4
2.	Metallurgy and manufactures of metals, and instruments therefor						4
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	1	2				2
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c		1		1		
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel					1	
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof					2	1
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers						1
8.	Mathematical, philosophical, and optical instruments, including clocks, chronometers					1	
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs				1	1	1
10.	Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof			6		2	3
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids				1		
12.	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights					1	
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements, and horse powers		1		1	2	4
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements						
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials				1		
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness				1		3
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing					3	
18.	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry						
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder		1	1			
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus						
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						
22.	Miscellaneous						1
	Total	1	6	8	8	18	24

MARYLAND.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.*
1.....	Agriculture, including instruments and operations	.....	 6	17	 8	35	23
2.....	Metallurgy and manufactures of metals, and instruments therefor	 2	 5	11	 2	 9	10
3.....	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	 1	 3	 7	 2	 8	12
4.....	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c	.....	 6	16	 6	 9	11
5 ...	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	 1	 2	13	13	16	15
6.....	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	 1	.....	 5	 5	21	30
7.....	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers	.....	 1	 6	17	 9	11
8.....	Mathematical, philosophical, and optical instruments, including clocks, chronometers	.....	 2	 1	 4	 1	 4
9.....	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs	 1	 4	 5	 4	16	12
10.....	Land conveyances, comprising carriages, cars, and other vehicles used on roads, and parts thereof	 1	 1	 2	11	32	13
11.....	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids	 1	 7	 4	 7	13	16
12.....	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights	.....	 1	.....	 2	 4	 5
13.....	Grinding mills and mill gearing, containing grain mills, mechanical movements, and horse powers	 1	 3	 2	 2	11	 7
14.....	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	.....	 2	 8	 2	 5	 7
15.....	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials	.....	 1	 3	 3	 2	 8
16.....	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	.....	 1	 6	.....	 8	 7
17	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	.....	 2	 3	11	13	10
18.....	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	.....	 1	.....	 2	 7	 5
19.....	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	.....	.....	 2	 1	 2	.....
20.....	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	 1	 1	 2	 2	 5	 5
21.....	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing	.....	.....	 2	 5	 4	 3
22.....	Miscellaneous	.....	 1	.....	.....	 4	 4
	Total	10	...50	...115	...109	...234	...218

* Extensions, 3; re-issue, 1; design, 1.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations	4	9	17	22	60	23
2.	Metallurgy and manufactures of metals, and instruments therefor	1	7	3	5	8	8
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper		2	9	8	7	5
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	3	4	16	5	11	4
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel		4	2	5	4	3
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	2		2	1	4	2
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers		1	3	3	8	5
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers			2	3	4	1
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs		2	3	5	14	4
10.	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof				2	6	1
11.	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids	1	1	8	14	12	4
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights		1	2	8	9	3
13.	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers	2		6	3	10	15
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and cooper's implements			7	1	7	7
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials		2	3	3	4	1
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	1		2	6	17	2
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing		3	3	6	13	6
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry		1		2	1	
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder			4	3	3	
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus			2		2	3
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing				1		2
22.	Miscellaneous				3	8	3
	Total	14	37	94	109	212	102

NORTH CAROLINA.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations		1	2	7	12	11
2.	Metallurgy and manufactures of metals, and instruments therefor				3	13	1
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper		3	3	2	1	1
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.		1	4	1		2
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel						
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof			2		4	
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers						
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers				1	1	
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs				1		
10.	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof				1	1	1
11.	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids				2		2
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights			1	6	1	
13.	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers		1	2	15	1	1
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements			1	4	5	7
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials						
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness				1		
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing				1	9	2
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry						2
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder						
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus				1		
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						
22.	Miscellaneous						
	Total		6	15	46	48	30

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations	2	3	4	13	12	5
2.	Metallurgy and manufactures of metals, and instruments therefor			1	3	2	4
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper		1				3
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.			2	1		2
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	1	1				1
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof				4	4	
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers			1	1	3	
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers		1	1			1
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, wiers, dams, and other internal improvements, buildings, roofs				2	1	1
10.	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof			2	2	3	2
11.	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids		2	2		1	1
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights		1		4		3
13.	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers		1		3	3	1
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	1			2		
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials	1				2	1
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness						1
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing					1	
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry			1			1
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder				1	1	
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus					2	1
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						2
22.	Miscellaneous		1				
	Total	5	11	14	36	35	30

GEORGIA.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations		1	1	1	3	4
2.	Metallurgy and manufactures of metals, and instruments therefor					3	3
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	3	2		2	1	3
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.				3	2	
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel					1	
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof		1	1		2	1
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers				2	1	3
8.	Mathematical, philosophical, and optical instruments, including clocks, chronometers						
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs			1			2
10.	Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof					1	
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising or delivering fluids				2	2	
12.	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising and moving weights				2	1	
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers			1	1	1	3
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	1		1		2	1
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials				1		2
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness					1	1
17.	Household furniture, machines and implements for household purposes, including washing machines, bread and cracker machines, feather dressing						2
18.	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry						1
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder						1
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus					2	1
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing					1	3
22.	Miscellaneous					1	2
	Total	4	4	5	14	25	33

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1	Agriculture, including instruments and operations						
2	Metallurgy and manufactures of metals, and instruments therefor						
3	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper						
4	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c						1
5	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel						
6	Steam and gas engines, including boilers and furnaces therefor, and parts thereof						
7	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers						
8	Mathematical, philosophical, and optical instruments, including clocks, chronometers						
9	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs						
10	Land conveyance, comprisng carriages, cars, and other vehicles used on roads, and parts thereof						
11	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising or delivering fluids						
12	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights						
13	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers						
14	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements						
15	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials						
16	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness						
17	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing						1
18	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry						
19	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder						
20	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus						
21	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						
22	Miscellaneous						
	Total						2

OHIO.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.*
1.	Agriculture, including instruments and operations	.....	 1	 1	15	63	75
2.	Metallurgy and manufactures of metals, and instruments therefor	.....	.....	.....	 4	12	29
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	.....	.....	 4	15	 9	22
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c	.....	 1	 4	10	16	18
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparing of fuel	.....	.....	.....	 3	15	58
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	.....	 1	 3	 9	12	17
7.	Navigation and maritime instruments, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers	.....	.....	 1	 7	 3	 5
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers	.....	.....	.....	.....	 4	10
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs	.....	.....	.....	 1	 8	 9
10.	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof	.....	.....	.....	 1	 5	15
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids	.....	 2	 5	12	22	23
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights	.....	.....	.....	 4	 3	21
13.	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers	.....	.....	 2	14	23	22
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	.....	.....	 1	 3	32	38
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements and other building materials	.....	.....	.....	 2	12	 8
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	.....	 1	 1	 6	13	19
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	.....	.....	 1	 5	19	33
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	.....	.....	 1	.....	 6	 3
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	.....	.....	.....	 4	 6	 3
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	.....	.....	.....	.....	 5	15
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing	.....	.....	1	 1	 3	 5
22.	Miscellaneous	.....	.....	.....	.....	 1	 3
	Total	.....	 6	25	...116	...292	...451

* Designs, 15; additional improvements, 1; re-issues, 3.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations					10	14
2.	Metallurgy and manufactures of metals, and instruments therefor						4
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper						
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c				1		1
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel					1	3
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof					3	1
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life preservers				1		
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers					1	
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams and other internal improvements, buildings, roofs						2
10.	Land conveyance, comprising, carriages, cars and other vehicles used on roads, and parts thereof						1
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids				1		3
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights						
13.	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers					1	3
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements					1	8
15.	Stone and clay manufactures, including machines for pottery, glass making. brick making, dressing and preparing stone, cements and other building materials						1
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness						1
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing						
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry				1		1
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder					1	
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus						
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						
22.	Miscellaneous						
	Total				4	18	43

INDIANA.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations	.....	.....	.....	 3	 2	27
2.	Metallurgy and manfactures of metals, and instruments therefor	.....	.....	.....	 1	 3	 3
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	.....	.....	.....	 1	 2	 1
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	.....	.....	 1	 1	 1	 1
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	.....	.....	.....	 1	 2	 1
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	.....	.....	.....	.....	 3	 6
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers	.....	.....	 1	 1	.....	 1
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers	.....	.....	.....	.....	.....	.....
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams and other internal improvements, buildings, roofs	.....	.....	.....	 1	 1	 4
10.	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof	.....	.....	.....	.....	.....	 1
11.	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids	.....	 1	 1	 1	 7	 1
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights	.....	.....	.....	 2	 2	 2
13.	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers	.....	.....	 1	 2	 2	 5
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	.....	.....	 1	.....	 7	 9
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements and other building materials	.....	.....	.....	.....	.....	 4
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	.....	.....	.....	 1	 2	 2
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	.....	.....	.....	.....	 3	 3
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	.....	.....	.....	.....	.....	 2
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	.....	.....	.....	.....	 1	 1
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	.....	.....	.....	.....	 1	 2
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing	.....	.....	.....	 1	.....	.....
22.	Miscellaneous	.....	.....	.....	.....	 1	.....
	Total	.....	 1	 5	16	40	76

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800	1810.	1820.	1830.	1840.	1850.
1	Agriculture, including instruments and operations,	.....	.....	.....	.....	2	29
2	Metallurgy and manufactures of metals, and instruments therefor	.....	.....	.....	.....	1	4
3	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	.....	.....	.....	.....	.....	1
4	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	.....	.....	.....	.....	.....	3
5	Caloriffc, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	.....	.....	.....	.....	.....	5
6	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	.....	.....	.....	.....	.....	1
7	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers	.....	.....	.....	.....	.....	2
8	Mathematical, philosophical, and optical instruments, including clocks, chronometers	.....	.....	.....	.....	.....	1
9	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs	.....	.....	.....	.....	1	9
10	Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof	.....	.....	.....	.....	.....	4
11	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids	.....	.....	.....	.....	1	5
12	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising and moving weights	.....	.....	.....	.....	.....	1
13	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers	.....	.....	.....	.....	2	4
14	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	.....	.....	.....	.....	.....	6
15	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials	.....	.....	.....	.....	2	2
16	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	.....	.....	.....	.....	.....	1
17	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	.....	.....	.....	.....	.....	3
18	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	.....	.....	.....	.....	.....	.....
19	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	.....	.....	.....	.....	.....	.....
20	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	.....	.....	.....	.....	.....	3
21	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing	.....	.....	.....	.....	.....	.....
22	Miscellaneous	.....	.....	.....	.....	.....	1
	Total	.....	.....	.....	.....	9	85

WISCONSIN.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations						3
2.	Metallurgy and manufactures of metals, and instruments therefor						
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper						
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.						
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel						
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof						
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers						
8.	Mathematical, philosophical, and optical instruments, including clocks, chronometers						
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs						1
10.	Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof						
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids						
12.	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising and moving weights						1
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers						1
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements						
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials						
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness						1
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing						
18.	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry						
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder						
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus						
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						
22.	Miscellaneous						
	Total						7

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1	Agriculture, including instruments and operations						
2	Metallurgy and manufactures of metals, and instruments therefor						
3	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper						1
4	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c						
5	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel						
6	Steam and gas engines, including boilers and furnaces therefor, and parts thereof						
7	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers						
8	Mathematical, philosophical and optical instruments, including clocks, chronometers						
9	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs						1
10	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof						
11	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids						1
12	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights						
13	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers						
14	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements						
15	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials						
16	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness						
17	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing						
18	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry						
19	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder						
20	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus						
21	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						
22	Miscellaneous						
	Total						3

MISSOURI.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations					1	4
2.	Metallurgy and manufactures of metals, and instruments therefor						1
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper						
4.	Chemical processes, manufactures and compounds, including, medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.				2		9
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel						1
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof						1
7.	Navigation and maratime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers						5
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers					1	
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs						1
10.	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof					2	2
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids						2
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights					1	5
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers						1
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements						1
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials						2
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness					1	
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing				1		2
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry					1	1
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder						
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus				1		1
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						
22.	Miscellaneous						1
	Total				4	7	40

CLASS.	INVENTIONS OR DISCOVERIES.	From 1890 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations		2		1	17	9
2.	Metallurgy and manufactures of metals, and instruments therefor		3			1	2
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper		1	8	9	13	4
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.			4	2	5	7
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel				2	2	1
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof			3	3	3	1
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers		4		2	2	
8.	Mathematical, philosophical, and optical instruments, including clocks, chronometers				2	1	
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs					2	1
10.	Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof					1	1
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids		1	2	1	2	7
12.	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights					5	1
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements, and horse powers		1		4	4	1
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements		2	2	2	2	3
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials				1	2	1
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness			2	2	4	1
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing				2	8	7
18.	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry		1		1		
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder		1			1	1
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus			1		6	4
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing				1		1
22.	Miscellaneous						1
	Total		16	22	35	81	54

TENNESSEE.

CLASS	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.*
1.	Agriculture, including instruments and operations	.....	.....	 1	 1	22	 8
2.	Metallurgy and manufactures of metals, and instruments therefor	.....	.....	.....	.....	 2	 1
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	.....	 2	 2	 1	 6	 4
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c	 1	.....	 1	 1	 2	.....
5	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	.....	.....	.....	 1	 2	.....
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	.....	.....	.....	 2	 1	 3
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers	.....	.....	.....	.....	.....	 1
8.	Mathematical, philosophical, and optical instruments, including clocks, chronometers	.....	.....	.....	.....	.....	 1
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs	.....	.....	.....	 1	 1	.....
10.	Land conveyances, comprising carriages, cars, and other vehicles used on roads, and parts thereof	.....	.....	.....	.....	 1	.....
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids	.....	.....	 3	 6	 6	 1
12.	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights	.....	.....	 1	 1	 3	 4
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements, and horse powers	.....	.....	.....	 6	 8	 2
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	.....	.....	.....	 2	 3	 4
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials	.....	.....	.....	.....	.....	 1
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	.....	.....	 1	 1	 2	.....
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	.....	.....	.....	.....	 5	.....
18.	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	.....	.....	.....	.....	.....	.....
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	.....	.....	.....	.....	.....	.....
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	.....	.....	.....	.....	.....	.....
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing	.....	.....	.....	.....	.....	.....
22.	Miscellaneous	.....	.....	.....	.....	.....	.....
	Total	 1	 2	 9	23	64	30

* Re-issue, 1.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1	Agriculture, including instruments and operations	.....	.....	.....	 1	 3	 4
2	Metallurgy and manufactures of metals, and instruments therefor	.....	.....	.....	.....	.....	 3
3	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	.....	.....	.....	 1	 1	 7
4	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	.....	.....	.....	.....	 1	 2
5	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	.....	.....	.....	.....	.....	.....
6	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	.....	.....	.....	.....	 1	 3
7	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers	.....	.....	.....	 1	.....	 1
8	Mathematical, philosophical and optical instruments, including clocks, chronometers	.....	.....	.....	.....	.....	 1
9	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs	.....	.....	.....	 1	 2	 2
10	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof	.....	.....	.....	 1	 1	 2
11	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids	.....	.....	.....	.....	 1	 4
12	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights	.....	.....	.....	 2	 2	 3
13	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers	.....	.....	.....	 1	 2	 7
14	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and cooper's implements	.....	.....	.....	.....	 1	 2
15	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials	.....	.....	.....	.....	.....	 1
16	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	.....	.....	.....	.....	.....	 4
17	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	.....	.....	.....	.....	 1	 2
18	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	.....	.....	.....	.....	.....	 3
19	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	.....	.....	.....	.....	.....	 1
20	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	.....	.....	.....	.....	 1	.....
21	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing	.....	.....	.....	 1	.....	.....
22	Miscellaneous	.....	.....	.....	.....	.....	.....
	Total	.....	.....	.....	 9	17	53

MISSISSIPPI.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1	Agriculture, including instruments and operations				2	2	6
2	Metallurgy and manufactures of metals, and instruments therefor						
3	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper				1	1	2
4	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.				1	2	1
5	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel						
6	Steam and gas engines, including boilers and furnaces therefor, and parts thereof						
7	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers				1		
8	Mathematical, philosophical and optical instruments, including clocks, chronometers						
9	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs					1	
10	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof						
11	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids				1	1	
12	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights				1	6	1
13	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers					1	
14	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements			1			
15	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials					1	2
16	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness						1
17	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing						
18	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry						
19	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder						
20	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus						1
21	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						
22	Miscellaneous						
	Total			1	7	15	14

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations						
2.	Metallurgy and manufactures of metals, and instruments therefor						
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper						
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.,						
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel						
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof						
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers						
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers						
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs						
10.	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof						
11.	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids						
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights						
13.	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers						
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements						
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials						1
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness						
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing						
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry						
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder						
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus						
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						
22.	Miscellaneous						
	Total						1

LOUISIANA.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.*
1.	Agriculture, including instruments and operations	.....	.....	.....	.....	 1	 3
2.	Metallurgy and manufactures of metals, and instruments therefor	.....	.....	.....	 1	.....	 1
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	.....	.....	 1	.....	 2	.....
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	.....	.....	 1	.....	 4	13
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	.....	.....	.....	.....	 2	 1
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	.....	.....	 2	 1	.....	 2
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers	.....	.....	.....	.....	 1	 1
8.	Mathematical, philosophical, and optical instruments, including clocks, chronometers	.....	.....	.....	 1	.....	 2
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs	.....	.....	.....	.....	 4	 6
10.	Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof	.....	.....	.....	.....	 1	.....
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising or delivering fluids	.....	.....	.....	 1	.....	 5
12.	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising and moving weights	.....	.....	 1	.....	 1	 7
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers	.....	.....	.....	 1	 1	.....
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	.....	.....	.....	 1	.....	 2
15.	Stone and clay manufactures, including machines for pottery, glass-making, brick making, dressing and preparing stone, cements, and other building materials	.....	.....	.....	 4	.....	.....
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	.....	.....	.....	.....	 1	 1
17.	Household furniture, machines and implements for household purposes, including washing machines, bread and cracker machines, feather dressing	.....	.....	 1	.....	.....	 1
18.	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	.....	.....	.....	.....	.....	 3
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	.....	.....	.....	.....	 1	.....
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	.....	.....	.....	.....	 1	 1
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing	.....	.....	.....	.....	.....	.....
22.	Miscellaneous	.....	.....	.....	.....	.....	 1
	Total	.....	.....	 6	10	20	50

* Re-issues, 1; additional improvements, 1; designs, 1.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations						
2.	Metallurgy and manufactures of metals, and instruments therefor						
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper						
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.						1
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel						
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof						
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers						1
8.	Mathematical, philosophical, and optical instruments, including clocks, chronometers						
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs						
10.	Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof						
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids						
12.	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights						
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers						
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements						1
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials						1
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness						
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing						
18.	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry						
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder						
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus						
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing						
22.	Miscellaneous						
	Total						4

DISTRICT OF COLUMBIA.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.
1.	Agriculture, including instruments and operations		1	3	4	4	3
2.	Metallurgy and manufactures of metals, and instruments therefor		1	5		3	6
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper		1	2	1		3
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.		2	4	4	6	4
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel			2	1	7	11
6.	Steam and gas engines, including boilers and furnaces therefor, and parts thereof		1		4	5	4
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers		1	6	12	4	5
8.	Mathematical, philosophical, and optical instruments, including clocks, chronometers			1	2	1	1
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs		3	1	4	5	3
10.	Land conveyances, comprising carriages, cars, and other vehicles used on roads, and parts thereof		1	1	1	3	3
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids			5	1	2	2
12.	Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights						
13.	Grinding mills and mill gearing, containing grain mills, mechanical movements and horse powers			2	2	2	2
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements			2		1	6
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials		1	1	1	6	2
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness			1	1	1	2
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing		2	1	1	2	4
18.	Arts—polite, fine, and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry			3	1	4	4
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder		2	5	1	3	7
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus						
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing				1		1
22.	Miscellaneous					1	
	Total		16	45	42	59	73

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.	1840.	1850.*
1.	Agriculture, including instruments and operations					1	
2.	Metallurgy and manufactures of metals, and instruments therefor	1			2	2	20
3.	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper				1	7	17
4.	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.					15	31
5.	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel					4	6
6.	Steam and gas engines, including boilers and furnaces thefefor, and parts thereof				6	3	17
7.	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life preservers				2	3	11
8.	Mathematical, philosophical and optical instruments, including clocks, chronometers						8
9.	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams and other internal improvements, buildings, roofs				1		4
10.	Land conveyance, comprising, carriages, cars and other vehicles used on roads, and parts thereof						7
11.	Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air or water, or employed in raising and delivering fluids				1		7
12.	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights						
13.	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers				1		2
14.	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements						2
15.	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements and other building materials						1
16.	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness					1	2
17.	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing				1		1
18.	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry					3	12
19.	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder						5
20.	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus						
21.	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing			1	1		2
22.	Miscellaneous						
	Total	1		1	16	39	155

* Extended, 1; re-issued, 1; additional improvement, 1. NOTE.—England, 159; Germany, 6; France, 26; Austria, 3; Prussia, 3; Russia, 2; Sweden, 6; Sandwich Islands, 1; Italy, 1.

AT LARGE.

CLASS.	INVENTIONS OR DISCOVERIES.	From 1790 to 1800.	1810.	1820.	1830.*	1840.	1850.
1.....	Agriculture, including instruments and operations	.....	.....	.....	.....	.....	 2
2.....	Metallurgy and manfactures of metals, and instruments therefor	.....	.....	.....	.....	.....	.....
3.....	Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper	.....	.....	.....	.....	.....	.....
4.....	Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.	.....	.....	.....	.....	.....	.....
5.....	Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel	.....	.....	.....	.....	 1	 3
6.....	Steam and gas engines, including boilers and furnaces therefor, and parts thereof	.....	.....	.....	.....	.....	 1
7.....	Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging and propulsion, diving dresses, life-preservers	.....	.....	.....	 1	.....	 1
8.....	Mathematical, philosophical and optical instruments, including clocks, chronometers	.....	.....	.....	.....	.....	.....
9.....	Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams and other internal improvements, buildings, roofs	.....	.....	.....	.....	 3	.....
10.....	Land conveyance, comprising carriages, cars and other vehicles used on roads, and parts thereof	.....	.....	.....	.....	.....	.....
11.....	Hydraulics and pneumatics, including water-wheels, wind-mills and other implements operated on by air or water, or employed in raising and delivering fluids	.....	.....	.....	.....	.....	.....
12.....	Lever, screw and other mechanical power, as applied to pressing, weighing, raising and moving weights	.....	.....	.....	.....	.....	.....
13.....	Grinding-mills and mill gearing, containing grain-mills, mechanical movements and horse powers	.....	.....	.....	.....	.....	.....
14.....	Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing, mortising, shingle and stave, carpenters and coopers' implements	.....	.....	.....	.....	.....	 1
15.....	Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements and other building materials	.....	.....	.....	.....	.....	.....
16.....	Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness	.....	.....	.....	.....	.....	.....
17.....	Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing	.....	.....	.....	.....	.....	.....
18.....	Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry	.....	.....	.....	.....	.....	.....
19.....	Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder	.....	.....	.....	.....	.....	.....
20.....	Surgical and medical instruments, including trusses, dental instruments, bathing apparatus	.....	.....	.....	.....	.....	.....
21.....	Wearing apparel, articles for the toilet, &c., including instruments for manufacturing	.....	.....	.....	.....	.....	.....
22.....	Miscellaneous	.....	.....	.....	.....	.....	 1
	Total	.....	.....	.....	 1	 4	 9

* 8 patents date unknown.

II.

INVENTIONS AND CLAIMS

FOR THE YEAR 1849.

No. 5993.—*Improvement in Shower Baths.*

Having thus described the nature, construction and operation of the shower bath, as improved by me, I will now point out what I consider and claim as my invention therein, and desire to secure by letters patent.

I do not claim the jet bath, neither do I claim the moveable reservoir, both having been used separately before, but I do claim and desire to secure the combination of a moveable reservoir with a jet bath constructed as herein described. This combination I believe to be new and useful, and to have been made for the first time by myself. EPHR'M LARRABEE.

No. 5994.—*Combined Beading Tool and Circular Shears.*

What I claim as my invention, is the combination in one frame, constructed as described, of a set of cutting dies and one or more sets of beading or edging dies so applied together and to the frame as to permit of the easy insertion of the plates at the commencement of the cut or any part of it, and so that the plate or sheet of metal may be operated upon simultaneously by both beading and cutting dies, when the frame is revolved on its spindles.

J. F. FLANDERS.

No. 5995.—*Improvement in attaching and detaching Hubs and Axles.*

Having thus fully described my improved method of forming hubs of carriage wheels, and attaching them to axles, what I claim therein as new, and for which I desire to secure letters patent, is the employment of the solid cap and circular nut combined and arranged as herein described.

R. D. MUNSON.

No. 5996.—*Improvement in Journals and Boxes.*

Having thus fully described our improved anti-friction journals and their mode of operation, what we claim therein as new, and for which we desire to secure letters patent, is—first, supporting the box or journal upon the series of mitre grooved rollers or blocks working into similar grooves on the journal and bearing, said rollers being without journals, and the whole being constructed and arranged substantially in the manner and for the purposes set forth.

THOMAS HOPPER.
THOMAS GARRISON.

No. 5997.—*Improved Swinging Bridge.*

What I do claim as my invention, is a draw constructed of two or more parallel turning frames or timbers E F, and supported and made to operate with respect to the bridge substantially, as above specified.

JOSEPH ROSS.

No. 5998.—*Improvement in Combined Ploughs.*

What I claim as my invention and desire to secure by letters patent, is the construction of the removable land sides with wings, substantially as represented, in combination with shares made without either bosses, loops, or other projections upon the sides that would interfere with their being turned bottom side up, and attached to the shanks in that position or obstruct their action when thus turned—the land sides and shares so constructed being connected together by one or more screw bolts, or by other analogous means.

ABNER LELAND.

No. 5999.—*Improvement in Ploughs.*

What I claim as my invention and desire to secure by letters patent, is the combination of the adjustable hinged and winged coulter *m*, with the mould board, land side and beam, the same being constructed and arranged substantially as herein described.

I also claim the combination of the auxiliary mould board *z*, with the principal mould board *d*, and adjustable coulter *m*, in the manner and for the purpose herein set forth.

JESSE LAYMAN.

No. 6000.—*Improvement in Turning.*

Having thus explained the nature of my invention, its construction and operation, I do not claim the combination of the saddle D, with the puppets, and chuck, and flange H H, merely to move crosswise on the lathe, but I claim the saddle D, constructed with a slot or slots, combined with pivots or screws, or swivels, and with another slot or slots in L L, the flange below, whereby the said pivots will act as centres or swivels for the saddle to be moved either transversely or set at any angle with the point of the cutter on the fixed spindle, so that when the box and chuck revolve around the cutter, and with the slide as it moves horizontally on the bed of the lathe, boxes for carriage and other wheels may be turned or rimmed out of any required interior taper, substantially as set forth.

ARUNAH S. MACOMBER.

No. 6001.—*Improvement in the manufacture of Lamp-black and Colophane.*

What I claim as my invention and desire to secure by letters patent, is the manufacture or production of lamp-black and colophane by one and the same process of decomposing rosin, substantially as described. I also claim as my invention in the apparatus above described for the manufacture or production of lamp-black and colophane, the combination of the lamp-black chamber and the colophane receiver with the retort, provided with the burners for inflammation, and the pipe for the delivery of the colophane, substantially as herein described. And, finally, I claim the hollow cylinder for the calcination of lamp-black in combination with the burners in the lamp-black chamber, substantially as described.

EDWARD CLARK.

No. 6002.—*Screw Wrench for grasping Cylindrical Forms*

What we claim in the above described wrench, and for the purpose of holding and turning cylindrical substances, is the combination of the lever D with the main bar of the wrench; also with the slide C, the nut B, and the spring E, substantially as herein described.

F. H. BARTHOLOMEW.
SOLYMAN MERRICK.

No. 6003.—*Method of bending Skelps, from which iron tubes are made.*

Having thus fully described my improvement, what I claim therein as new, and for which I desire to secure letters patent, is the mould constructed and arranged substantially as described, in combination with the finishing rollers of a common rolling mill.

JAMES M'CARTY.

No. 6004.—*Improvement in connecting Hubs and Axles.*

What I claim as my invention and desire to secure by letters patent, is the confining an axle or journal within a box, by means of a spherical ball or balls running in a channel made partly in the journal and partly in the box.

CHARLES CHINNOCK.

No. 6005.—*Machine for hook heading Spikes by one motion.*

What I claim as my invention and desire to secure by letters patent, is the combination of the carriage and punch holder, constructed substantially as described, with the roller or its mechanical equivalent as described, by means of which the spike is hook headed by a single motion.

JONATHAN BEARDSLEY.

No. 6006.—*Improvement in Musical Instruments.*

What we claim as our invention and desire to secure by letters patent, is the making and application of detached sheets, plates, or theorems, prepared by perforating, indenting, or otherwise adapting them to operate hammers, weights, keys, valves, levers, wires, or springs, to produce music or musical tones, using for the said sheets, plates, or theorems, any metal or material which will produce the intended effect. We also claim the right to hook or catch the ends of the said sheets, plates, or theorems together, so as to form an endless band if desired; and the right to use the above described gibs or cams D, springs M and L, moveable frame I, and rollers A and B, as arranged in the accompanying drawings; the said rollers prepared by grooving or otherwise adapting them to give motion to said sheets, plates, or theorems, for the purpose of producing music or musical tones by operating hammers, weights, keys, valves, levers, wires, or springs.

ADONIRAM F. HUNT.
JAMES S. BRADISH.

No. 6007.—*Improvement in Ploughs.*

What I claim as my invention and desire to secure by letters patent, is the corn fender C, in combination with the cultivator teeth A A, and the plough acting in the manner and for the purpose set forth.

WILLIAM RICHTER.

No. 6008.—*Improvement in Tailors' Shears.*

What I claim as my invention and desire to secure by letters patent, is the construction of the lower blade, separate from the upper lever, and connected with it by a joint, as above described. I also claim the application of the bar to steady the action of the lower blade, constructed and operating as herein described; and also the combination of the lower blade with the upper hand lever, in the mode of application described.

BENJAMIN W. WARNER.

No. 6009.—*Improvement in machines for gathering Pea Vines.*

What I claim herein as new and desire to secure by letters patent, is the mode of securing vines in a green state, by putting them up in hollow rolls, made as above described, and also the apparatus for the purpose of gathering vines and forming said rolls, as described in the above specification.

JOHN B. STANLEY.

No. 6010.—*Improvement in the manufacture of Hats.*

We claim the application of a solution of gutta percha, to the purposes of stiffening hat bodies, and uniting the plush or other cover to the body, as a substitute for shel-lac, glue-size and seed-lac, or other articles hitherto used for such purposes, as described.

ADRIAN BANCKER.
C. F. ALVORD.

No. 6011.—*Improvement in Tooth Extractors.*

What I claim as my invention and desire to secure by letters patent, is the compound fulcrum consisting of parts *g* and *d*, fig. 1, arranged and constructed in the manner and for the purpose described.

ENOCH OSGOOD.

No. 6012—*Improvement in painting Telegraph Wires.*

What I claim as my invention and desire to secure by letters patent, is the construction of an apparatus for aiding in the painting or coating of telegraph wires, (or for other purposes,) by the combination of rotating and stationary brushes and suspension pulleys, or their equivalents, with a portable receptacle for paint or other coating matter, substantially in the manner herein set forth. Not intending by this claim to limit myself to the particular form, number and arrangement of the parts composing the apparatus for aiding in the painting or coating of telegraph wires, as herein represented and described, but to vary the same as I may deem expedient, whilst I attain the same end by means substantially the same.

BENJAMIN H. GREEN.

No. 6013.—*Improvements in moulding and compressing Cores.*

What I claim as my invention and desire to secure by letters patent, is—1st. The improvement in the core tube (H,) caused by severing it by a longitudinal slit, for the purpose herein set forth. 2d. I claim the manner of compressing a coating of sand upon my improved core tube, or upon any core tube or rod, (or the formation of solid sand cores,) by means of sections operated by machinery substantially in the manner herein described; one of said sections being stationary, towards which another section is forced in a direction perpendicular to its plane; and the two other sections being forced towards each other, between the two first described, the whole of them arranged and operating substantially as herein described. 3d. In combination with the above mentioned core box sections, or any other analogous core-forming sections, I claim the (slightly elastic) core tube bearing plates J J, and caps *f f*, (or their equivalents,) substantially in the manner and for the purpose herein set forth. 4th. I claim the manner of compressing the sand into a half flask and giving it the impression of the pattern, by placing the pattern at the base of a forming box and covering it with sand, and then placing the half flask upon the sand covering the pattern and forcing it down upon the same by machinery, substantially as herein described. 5th. I also claim the manner of preserving

the cores in a central position within the moulds, by means of concavo-convex skeleton or open stays (*a*,) formed of thin, narrow sheets of metal, and combined with a core and mould substantially in the manner herein represented and described. CHAPMAN WARNER.

No. 6014.—*Improvement in Stop Motion for Drawing Frames.*

What I claim as my invention and desire to secure by letters patent, is the method substantially, as herein described, of stopping the operation of drawing frame or drawing heads by means of guides, each of which is attached to an end of a horizontal balance lever, so that they shall be kept down (to permit the drawing head to operate) by the weight of the roving, and fly up to stop the machine the moment they are relieved of the weight of the rovings as described.

I also claim the employment of a flying trigger, substantially as described, in combination with the apparatus for shifting the belt, or any other substantially the same as described, whereby the trigger flies past the end of the catch lever, to permit the mechanism that shifts the belt to be re-set without delay as described. CHARLES DANFORTH.

No. 6015.—*Machine for Filing Saws.*

Having thus fully described our apparatus for filing and setting the teeth of saws, what we claim as our invention and desire to secure by letters patent, is, first, the combination and arrangement of the operating file handle H, the adjustable standards G G, rising from the turn table I, the adjustable bearing plates J J, (secured to the standards G G,) the elastic arm *m*, point *d*, and curved gauge plate *k*, with each other and with the saw clamp A, substantially in the manner and for the purpose herein set forth.

PRESBERY NORTON.
FRANKLIN D. COTTLE.

No. 6016.—*Improvement in Corn Planters.*

Having thus fully described my improved grain and seed planter, what I claim therein as new, and desire to secure by letters patent is the combination of the index *a*, on the axle *g*, and the numbers or marks on the cover K of the grain box, with the apertures *i*, in the planting plate D, substantially in the manner and for the purpose herein set forth.

B. F. PARTRIDGE.

No. 6017.—*Improved Dies for bending Tube Skelps.*

Having thus fully described my improvements in forming skelps of wrought iron into tubes ready for welding, what I claim therein as new and desire to secure by letters patent, are the dies or tongues, formed substantially as herein described, for forming skelps into the proper curve for welding, in the manner set forth. JOSEPH M'CULLEY.

No. 6018.—*Improvement in Bog Cutters.*

Having thus fully described my invention, what I claim therein as new and desire to secure by letters patent is, first, the providing the front or inclined part of the runners of the sled with steel knives *b*, for the purpose herein specified. Secondly, I claim the combination of the sled *a*, with the frame work *c*, to which the horizontal knives are attached. And, lastly, I claim

the combination of the double horizontal knives *h h*, &c., resting on the surface of the ground, and inclining backward at an angle of about 45 degrees with the pole *g*, for the purpose and in the manner herein specified and fully made known. JOHN D. FILKINS.

No. 6019.—*Improvement in Cast Iron Car Wheels.*

What we claim as our invention and desire to secure by letters patent, is the peculiar construction of the spoke of the wheel here described, the same being formed of a folded plate, doubling to nearly parallel lines at the hub, and expanding towards the rim, uniting to it in nearly a semi-circular form, thus covering and sustaining the rim, while the complex curvature of the spoke, the same being curved in a verticle as well as in a lateral direction, allows an expansion and contraction of the metal favorable to the durability of the wheel, and permits it to be cast solid with an entire hub without cracking; the whole being constructed and arranged substantially as above set forth and described. LEWIS DEAN.
A. HIGHAM.

No. 6020.—*Improvement in Ploughs.*

I do not claim the invention of any particular plough, but simply this method of regulating the draught by the above described standard D, bolt FF, and regulating set E. It can also be applied to all agricultural tools where a clevis is required of any kind.

HEMAN B. SINCLEAR.

No. 6021.—*Improvement in Cast Iron Car Wheels.*

Having thus fully described my improved wheel, what I claim therein as new, and for which I desire to obtain letters patent, is the combination of the arch piece *b*, and the hollow annulus *c*, and the solid annular parts *d* and *f*, by which the solid hub is connected with the rim and flanch, the whole being arranged substantially in the manner and for the purposes above set forth and specified. WM. B. TREADWELL.

No. 6022.—*Improvement in Cast Iron Car Wheels.*

What I claim as my invention and desire to secure by letters patent, is the constructing of wheels for railroads, or other purposes, with spokes, single plate and double plate combined, as herein described.

JAMES M. COOK.

No. 6023.—*Improvement in Body Braces.*

I disclaim the invention of parallel spinal springs, used in combination with shoulder braces, illium springs, and abdominal pads, but I claim as my invention and improvement the employment of combined serpentine and straight slotted springs, with the shoulder straps B B, and back pads C C, when constructed as described; said elastic serpentine springs being formed and arranged as set forth, admitting of a more easy, lateral and twisting motion of the body of the wearer than can be obtained by the use of the flat dorsal spring as now used—said serpentine springs having likewise a constant tendency to extend themselves longitudinally, which causes them to have a continuous upward bearing against the shoulder braces, which relieves the

spine of a portion of the weight of the upper part of the body by a constantly lifting action.

I likewise claim the manner of constructing the back pads C C, as described, that is to say, each with a revolving ring to which the illium spring is attached, and circular notched groove in which the pinion and axle (attached to the ring and illium spring) play round freely during the operation of adjusting the abdominal pad—the teeth of the pinion being constantly engaged with the teeth of the circular groove, the use of said circular groove allowing the abdominal pad to be changed to a variety of positions, horizontally, vertically, obliquely.

I also claim the manner of constructing the abdominal pad G, that is to say, with a hollow revolving plate *o* for the purpose of taking in the spring *n*, and letting it out by turning plate *o*, and thus graduating its length and pressure upon the inner plate *m* of the abdominal pad G, thereby fitting the pad to different protuberances of the abdomen. HENRY MELLISH.

No. 6024.—*Improvement in Cast Iron Car Wheels.*

What I claim as my invention and desire to secure by letters patent, is the single plate which connects the hub and rim with curved arms thereon, reversed to the right on the one side of the plate, and to the left on the other, and likewise my mode of tempering the said wheels herein described, by which all injury to the chill of the wheel is avoided.

EDWARD BONNEAU BAKER.

No. 6025.—*Improvement in Knitting-Needles.*

What I claim as my invention and desire to secure by letters patent, is the application of a latch or tongue applied to the hook of the needle, and operated as herein described. JAMES HIBBERT.

No. 6026.—*Improvement in Cast Iron Car Wheels.*

What we claim and desire to secure by letters patent, is the *mode of connecting the arms* of one side with those of the other side, when formed substantially *in the manner before mentioned.* A. T. CONVERSE.
WM. S. COOLEY.

No. 6027.—*Improved Rotary Blacksmiths' Tuyere.*

I do not claim the invention of a revolving or vibrating hearth for blacksmiths' forges, as these have been made and used; but what I do claim as my invention, and desire to secure by letters patent, is the employment of a revolving perforated spheroid oblate at one of its poles, as a rotary central bottom for blacksmiths' forges, in combination with the convex hearth and attached air chamber, constructed, arranged and operated substantially in the manner and for the purpose herein set forth, performing the combined office of a fire regulator and coal agitator. EPHRAIM HARRIS.

No. 6028.—*Improved Lubricating Compound.*

Having thus described the manner in which my anti-attrition is compounded and used, what I claim therein as new, and desire to secure by letters patent, is the combination of ingredients herein described, or of others possessing similar properties, and forming an analogous compound, whether the proportions be the same as herein set forth, or varied to any extent that the same

may admit of, without changing the peculiar character of the compound as a lubricator.

PATRICK S. DEVLAN.

No. 6029.—*Improved method of directing the scoops in Dredging Machines.*

Having thus described my invention, I do not claim the revolving buckets for excavating, as they have been long used for that purpose, but I claim the vertical sliding frame F, to regulate the scooping line of draught, in combination with the suspension levers, whereby the buckets, as they revolve over the pulleys, are made to scoop at any angle at any depth.

JAMES CALLAGHAN.

No. 6030.—*Improvement in Cast Iron Car Wheels.*

What I claim as my invention and desire to secure by letters patent, is tieing and bracing the arms of the wheel together in the annular space between the rim and hub, substantially as described in the foregoing specification and represented in the annexed drawings, forming intermediate, or auxiliary, or zig-zag rims in said annular space, and double the number of bearing points on the rim that there are on the hub, by which form of construction cast iron chilled car wheels are rendered much stronger and less liable to fracture in casting than the cast iron spoke wheel in use.

SAMUEL TRUSCOTT.

No. 6031.—*Improvement in Boot Trees.*

What I claim as my invention and improvement, and desire to secure by letters patent, is the method of crimping boot fronts by means of a sliding lever, affixed to an ordinary boot form, on the back and bottom thereof, extending from the top of the form around the heel with a joint, and thence under the foot of the form towards the toe thereof.

I claim the combination of the jointed sliding lever B B, C C, inclined planes *l*, *m*, *n*, slides D D, *a*, *b*, *d*, and E, hinge X, tie *p*, stop *r*, and the screws as applied thereto for the purposes set forth, constructed and operated in the manner and form above represented and described.

HENRY WRIGHT.

No. 6032.—*Improvements in Stop Cocks for hot water and steam.*

Having thus described the construction and operation of my improved hot water cock, what I claim therein as of my invention and discovery, and for which I solicit letters patent, is the wooden stopper, in combination with an expanded recess for its reception, and with a stem entirely unconnected with it, there being a washer between them, so that the stopper may be pressed down upon its seat by the stem without turning, whereby the cost and difficulty of making and keeping it in repair is lessened, and its durability and efficiency increased, as herein set forth.

JOHN SHERIFF.

No. 6033.—*Improvement in Clapboard Machines.*

Having thus fully described my improved clapboard machine, what I claim therein as new, and desire to secure by letters patent, is the combination of the several parts thereof in such manner that it will automatically saw clapboards of the shape herein described, viz: the vibrating frame or adjustable portion of the carriage hinged to the lower portion, the head block D, the racks

I I, (projecting from D) the shaft H, with the pinions *i*, mashing into racks I I, the shaft F, geared to H, the ratchet wheel *b*, and the vibrating lever *d*, connected to shaft F, the palls *c c*, on the upper end of *d*, playing into the ratchet wheel *b*, the studs M N, projecting from the rear end of the machine, the leg or supporter *g*, (descending from the adjustable portion of the carriage,) the inclined planes *j*, *k*, *l*, rising from the front end of the vibrating lever L, the tooth *w*, projecting from the inner side of L, the ratchet wheel K, secured to the side of the machine, the palls *o*, *v*, (descending from the carriage,) the axle *p*, with the tooth *r*, and the balance lever V, the vibrating levers X, and Y, the axle *m'*, the toothed wheel Z, and pinion *b'*, on *m'*, the pinion *a'*, on the shaft J, the pinion *u*, on the shaft W, mashing into the rack *z*, on the underside of the carriage, the elastic notched rod *e'*, rising from the front end of lever Y, the retaining pin *h'* projecting from the side of the machine, the weight *g'*, suspended to the front end of lever Y, the elastic notched rod *f'*, rising from the rear end of lever X, the retaining pin *h''*, projecting from the side of the machine; the weight *g''*, suspended to the rear end of lever X, and the block *t'*, projecting from the underside of the carriage—the above enumerated parts, or their equivalents, I claim the arrangement and operation substantially as herein set forth. I also claim the particular combination of the inclined planes *j*, *k*, *l*, rising from the front end of the vibrating lever L, the tooth *w*, projecting from the inner side thereof, the ratchet wheel K, the leg or supporter *g*, (descending from the adjustable portion of the carriage,) the axle *p*, with its retaining tooth *r*, and balance lever V, the palls *o*, *v*, descending from the carriage, and the projection *q*, from its side, arranged and operating substantially as herein set forth, for the purpose of producing a regular alternating up and down movement of the outer edge of the adjustable or vibrating portion of the carriage.

I also claim, in combination with the respective parts for vibrating the upper portion of the carriage, the studs M, and N, the vibrating lever *d*, the palls *c*, *c*, the ratchet wheels *b*, the shafts F, and H, and the racks I I, (connected to the head block D,) for the purpose of imparting the proper feed motion to the timber placed upon the vibrating portion of the carriage, substantially in the manner herein set forth.

I also claim the combination of the toothed wheel *Z*, having internal teeth, and the pinion *b'*, on the same axle, with the pinion *a'*, on the vibrating end of the shaft J, and the weighted levers and spring catches for the purpose of communicating a slow forward movement to the carriage, and a rapid backward movement thereto, substantially in the manner herein represented and described.

By the foregoing claims I do not intend to limit myself to the exact form, number and arrangement of parts as herein described and represented, but shall vary them as I may deem expedient, whilst I attain the same end by means substantially the same.

BLISS CORSER.

No. 6034.—*Improvement in Harvesting Machines.*

First. I claim the *form* of the *fixed sickles t*, with the *curved edges*, in combination with the *triangular sickles q*, attached to the *vibrating bar p*, and operated substantially as herein above specified.

Second. I claim the *combination* and *arrangement* of the guide rail U, with the *reel heads b*, the *chain bands a*, the *revolving rake g*, and the *inclined platform* S, formed, applied, and used substantially as above set forth.

Third. I also claim the combination of the *trap doors* or *folding platform*

W, for the purpose of forming and dropping the grain in a bundle, with the *cam-blocks, inclined wedge*, levers and cord, or other similar devices, arranged and operated in substantially the same manner for attaining the same object.

OLIVER BARR.

No. 6035.—*Improvement in Looms.*

What we claim as our invention and desire to secure by letters patent, is as follows:

First. We claim the combination of the picker valve alternator and slide spring, operated in the manner and for the purpose described.

Second. We claim the combination of the picker table, picker arm, picker staff, picker roller, and roller 15, arranged in the manner and used for the purpose set forth.

Third. We also claim the combination of the marcher, oblique slide, marcher slide, marcher catch, levers 38, catch springs, and heddle guides, constructed in the manner and for the purpose set forth.

JUSTUS BUTLER.
ALFRED BIGELOW.

No. 6036.—*Improvement in machinery for Post-marking Letters, &c.*

What I claim in my invention for post-marking letters, is the spring grips as applied in combination with the cylinders B, and C, and letter conveyor, and to each printing block and bed, substantially as described.

Second. I claim spring stops Y, and apparatus for working them, as applied in connection with each endless belt or apron and the spring grips, and made to operate substantially as specified.

And lastly, I claim to make the beds or printing surfaces or blocks, so as to be capable of receding and adapting themselves to letters or parcels of various thicknesses, as specified.

EMERY N. MOORE.

No. 6037.—*Improvement in Cultivators.*

I do not claim in this application the invention of a wheeled cultivator nor hollow wrought iron teeth, with keys driven into the hollows of the teeth; but what I do claim as my invention, and desire to secure by letters patent, is—first, the mode of raising and lowering the frame A, containing the cultivator teeth M, for the purpose of gauging the machine for deep or shallow ploughing, or for moving it from place to place, without causing the teeth to touch the surface of the earth, by means of the *before described combination and arrangement of the crank axletree D, cogged wheel F, cogged segment H, short axle G, lever I, and perforated holding plate L, employed in combination with the frame A, of cultivator teeth M, and sustaining wheels W W.*

I also claim the combination and arrangement of the binding and sustaining plates N, made as described, in combination with the transverse beams as described, to which said plates are secured.

DAVID B. ROGERS.

No. 6038.—*Improvement in machinery for making Boxes.*

Having thus described the nature of my invention, the way in which it is constructed, and its operation, I do not claim any particular part of the machine as new, but what I claim as my invention, and for which I desire letters patent, is the combination of well known principles to effect an object

which has not been effected before, which is to turn a box and cover by one operation, as fully set forth and described. What I claim as my invention, is the arrangement of the sweep S S, in combination with the gauge rods E E, for varying the length of box and cover in combination with the ratchet wheels R R, and the curved and notched rods L L, as fully described and set forth. I finally claim the whole as a combination of the machine for effecting the object as fully set forth and described.

WILBUR M. DAVIS.

No. 6039.—*Improvement in Mill Bushes.*

What I claim as new, and desire to secure by letters patent, is the constructing and arranging the bush for a verticle spindle or shaft, in such a manner that it will perfectly adjust itself to the bearing surface of the spindle or shaft, as it or the bush wears away by friction, by making the bearing surface of the spindle or shaft, and the aperture in the bush for its reception, of a corresponding conical form, and so fitting the bush into a supporting frame that it may have free verticle play therein, and be kept in a proper position for bearing upon the spindle or shaft with the requisite force by means of levers and weights, or their equivalents, substantially as herein set forth.

I also claim in combination with a conical self-adjusting bush for vertical shafts or spindles, the oil cup having inclined revolving lubricators, whereby the necessary quantity of lubricating material is supplied to the bearing in the manner herein set forth.

I also claim, in combination with a bush frame or cylindrical enclosing support, the use of bushes or bearings for vertical shafts or spindles, with slightly spherical exterior zones to traverse the interior of the vertical frame, whereby trifling deviations from a perpendicular position in the spindle may take place without danger of deranging the supporting frame or the closing plate of the bush that secures the oil from dust, in the manner herein set forth; not intending in these claims to limit myself to the precise arrangements described, but to vary them at pleasure, while I attain the same ends by means substantially the same.

HAZARD KNOWLES.

No. 6040.—*Improvement in Indicating Telegraphs.*

What I claim as my invention and improvement, and desire to secure by letters patent, is—

1. The mode of conveying intelligence at distances by means of a revolving tooth dial plate, marked in the manner set forth with the several successive repetitions of the series of numerals 0, 1, 2, 3, 4, arranged in a circle on the face of the same for representing the letters of the alphabet; said dial plate being turned by degrees, as required by the combination of the escapement cord and weight, the pallets, lever and spring, the armature and lever being actuated by the electro magnet, by breaking and forming the circuit; the whole forming what I call "*The American Indicating Disc Telegraph.*"

2. I also claim the peculiar construction and invention of the escapement, as herein described, for actuating the dial plate, consisting of the combination of the pallet bar, the pallets, the triangular teeth; the whole work being confined to the inside, instead of being on the periphery of wheels, as pallets and teeth of escapements heretofore have been constructed.

3. I also claim as my invention and improvement the system of signs, consisting of the combination of the numerals 0, 1, 2, 3, 4, for indicating all the

letters of the alphabet and words and sentences, by the use of which the necessity of having the whole or any part of the alphabet on the revolving disc, and of turning it a revolution, or nearly so, in order to indicate a particular letter, is dispensed with, it being only necessary to turn the dial plate a segment or so of a circle at each combination of figures to indicate a letter, which is done instantly, by simply forming and breaking the circuit; and having thus formed the letters, it is evident that words can be spelled with great rapidity, substantially as herein set forth.

L. G. CURTISS.

No. 6041.—*Improvement in Cast Iron Plate Car Wheels.*

What we claim as our invention and desire to secure by letters patent, is the arrangement of cross ties and stays in the interior part of the hub of a plate car wheel, in combination with the expansion disks or rings herein described, whereby those ties which unite two contiguous plates or disks shall alternate with those ties which connect one of said two disks to a third, by which means the elasticity both of the disks and stays is made available to meet the shrinkage of the wheel; not intending in these claims to confine ourselves to the precise arrangement described, but to vary the same at pleasure, while attaining the same ends by means substantially the same.

HORACE FELTON.
PERLEY D. CUMMINGS.
HARINGTON HINCKLY.

No. 6042.—*Improvement in rails and wheels for turning curves of Railroads.*

What I claim as new and desire to secure by letters patent, is the giving to the inner rails on railroad curves a greater breadth than is necessary for the bearing of the wheels thereon, and so sloping the side inwards towards the middle of the track as to prevent any contact between the slope and the tread of the wheel, while it still serves to guide the flanch of the same, and thus to allow the coning part only of the wheel to travel on the inner rail of the curve, substantially in the manner herein set forth.

I also claim, in combination with the widened and bevelled inner rails of railroad curves, the use of wheels having treads divided into two portions, the one cylindrical or nearly so, and the other coning, in the manner and for the purposes herein set forth. Not intending in these claims to limit myself to the precise arrangements herein described, but to vary the same at pleasure, while I attain the same ends by means substantially the same.

J. F. B. FLAGG.

No. 6043.—*Improvement in Cylinders for carrying and supporting Cards, &c.*

What I claim as new and of my own invention, and desire to secure by letters patent of the United States, is that constructive arrangement and conjoint application and action of the parts employed as described and shown herein, by which metal plates, surrounded by a wire helix and solder, are united to form cylinders of more than usual strength, in proportion to weight, and the application of such cylinders to any mechanical purposes, for which they are or may be available.

STEPHEN R. PARKHURST.

No. 6044.— *Improvement in the manufacture of Cylinders for Burring Wool, &c.*

Having thus described my improved mode of constructing a cylinder for burring, opening, &c., cotton, wool, and other fibrous materials, I shall state my claim as follows:

What I claim as new, and desire to have secured to me by letters patent, is a *cylinder* for burring, opening, picking, carding and performing all other similar operations on cotton, wool, &c., formed or produced by winding toothed wire (having flanges and teeth as herein above specified) upon the periphery of a metallic cylinder, either in a spiral or straight direction, whether the said wire be fastened thereon in spiral grooves and properly staked, or by soldering or otherwise, as herein above suggested.

FRANCIS A. CALVERT.

No. 6045.—*Improvement in Shingle and Stave Dressing Machines.*

What I claim as my invention and desire to secure by letters patent is—

First. The construction and application of the quadrangular wheel, with its appurtenances, viz: the rollers and hands, to the use and purposes above described.

Secondly. I also claim the invention of the sliding or vibrating table, and its application, with its appurtenances, to the uses ascribed to them above.

Thirdly. I too claim the application of the inclined plane to the purpose described above; and—

Finally. I claim the above described construction and arrangement of the whole machine, taken in combination, and applied to the purposes ascribed to them above.

ELISHA LUTER.

No. 6046.—*Improvement in Chucks for Lathes.*

Having thus described the construction of my universal self centering chuck, what I claim therein as new and desire to secure by letters patent, is the combination of the connecting rods and jaws jointed together, and moving simultaneously, by means of a screw or otherwise, with the chuck plate, whether the several parts be made and arranged as herein set forth, or in any other substantially similar manner, by which the jaws are moved towards or from the centre of the plate at the same time and at equal speed.

WILLIAM GRANT.

No. 6047.—*Improvement in Shower Baths.*

Having thus fully described my invention, I may add, that I do not claim as my invention, the combination of lateral jets with a rising and falling cistern, but what I do claim, is the combination of the showering pan C, a divided cistern and horizontal arms, as herein described, whereby the head may be showered with water of one temperature and the lower parts of the body with water of another temperature during the same operation.

I also claim in combination the douche bath, the divided cistern and tubes with horizontal jet arms, as herein set forth, to give a douche to the head and a shower to the other parts of the body of a different temperature.

I also claim making the showering pan C, capable of being separated from the cistern, and of thereby making way when required, for the use of the central douche tube D, as herein set forth.

I also claim the adjustable sliding section tubes E E′, &c., having horizontal

moveable arms *a a'*, &c., with jets, as herein described, capable of being brought nearer to or more remote from each other, for the purpose of concentrating more or less the shower thrown on the lower parts of the body; not intending in these claims to limit myself to the exact arrangements of parts herein described, but to vary the same at pleasure, while I attain the same ends by means substantially the same.

JAMES CORTLAN.

No. 6048.—*Improved Roller Ox shoe machine with moveable dies.*

I make no claim to the frame, roller, axles, and gearing, as these are made and arranged like the ordinary rolling mills, nor do I claim segment dies fastened on rollers by screws; but what I do claim as my invention and desire to secure by letters patent, is the employment of the segment and triangular dies H I, constructed and arranged and operated substantially as above described, in combination with the cylinder made with bevelled collars and nut for securing them, as herein set forth.

PHILIP PITTS READ.

No. 6049.—*Improvement in Seed Planters.*

Having thus fully described my improved corn drill or seed planter, what I claim therein as new and desire to secure by letters, is the combination and arrangement of the grain box B, the cup H, the rotating perforated plate A, the elastic brush J, and the recesses V V, in the lower edge of the rear side of the grain box placed in such a manner that the operation of the said parts is brought immediately under the eye of the operator for causing a single kernel to be deposited at a time in the drill as the machine is moved forwards, substantially in the manner herein set forth.

E. J. DICKEY.

No. 6050.—*Improvement in Seed Planters.*

Having thus fully described my improved seed drill, what I claim therein as new and for which I desire to secure letters patent, is—First. The construction and arrangement of the adjustable hopper and grooved roller combined, as above set forth, and for the purposes designated. Secondly. I claim the centre hind wheel *m*, for guiding and regulating the apparatus as herein before described.

JACOB C. MILLER.

No. 6051.—*Improvement in Wool Cleaning and Lapping Machine.*

Having thus described my improvements in machinery for picking, cleaning and forming a lap of cotton, &c., I shall state my claims as follows:

What I claim as my invention and desire to have secured to me by letters patent, is a toothed cylinder for forming a lap of cotton, wool, or other fibrous material, to be used in lieu of the wire netted cylinder, as herein above set forth.

I also claim the combination of the burring apparatus, or an apparatus for opening, picking, and cleaning cotton and wool, constructed substantially as herein above described, with the calender and lap rollers; the arrangement and combination being as herein above set forth and for the purposes specified.

FRANCIS A. CALVERT.

No. 6052.—*Combined Double Hinge and Spring.*

What I claim as my invention and desire to secure by letters patent, is *double jointed hinges*, constructed substantially as herein described, in combination with a chain or cord and two springs, arranged as herein set forth.

ANDREW B. TAFT.

No. 6053.—*Improved self-inflating and folding Life Boat.*

What we claim and desire to secure by letters patent, is forming the sides of life boats of two or more thicknesses, of flexible material, impervious to both air and water, so arranged and in combination with gunwales, or intermediate gunwales, and the bottom, as to form air chambers on both sides of the boat from stem to stern, which may be inflated with air, more or less, by raising up the gunwales or intermediate gunwales from the bottom of the boat on which they rest, when the boat is folded up substantially as described.

WM. SCHNEBLY.
THOMAS SCHNEBLY.

No. 6054.—*Improved process for Welding cast to wrought Iron or Steel.*

We do not claim heating wrought iron in a furnace and then placing it in a mould and casting iron around it so as to enclose it therein, that having before been done; but having thus fully described our improvement, what we claim therein as new, and for which we desire to secure letters patent, is heating the steel or wrought iron to which the cast iron is to be affixed before casting the melted iron upon it, by means of a portion of melted iron poured against that side of the steel which is not to be attached to the finished article, substantially in the manner and for the purpose set forth.

We also claim repouring the metal upon the steel, as described, by which much saving in the cost of melting more iron than is required for the casting is saved.

M. FISHER.
WM. MARTIN, Jr.

No. 6055.—*Improvement in Machines for making Envelopes.*

Having now described the various parts of our machine and the operation of the same, what we claim as our invention and desire to secure by letters patent, is the invention herein described for making envelopes, the same consisting of the stamper rod, the gumming apparatus, and the folding apparatus, each and all constructed and operating substantially in the manner set forth.

JESSE K. PARK.
CORNELIUS S. WATSON.

No. 6056.—*Improvement in taking Daguerreotype Pictures.*

I do not confine my invention to the use of a screen, made of any particular material or materials, but what I do claim as my improvement in combination with the daguerreotype process, is the above specified mode of arranging and operating an opaque, or partially opaque screen having an apperture or its equivalent, the same being placed between the sitter or object and the camera, and put in motion or maintained in position substantially as above specified.

JOHN A. WHIPPLE.

No. 6057.—*Improvement in Guards or Strippers for Burring Machines.*

Having thus described my improvements, I shall state my claim as follows: What I claim as my invention and desire to have secured to me by letters patent, is a guard or stripper cylinder, (used in machines for burring wool and cleaning cotton,) *constructed with steel strips* a a, *&c., for scrapers, arranged and combined with the wooden segments* d d, *&c., about a roller or shaft, substantially as herein above described.* ALEX. WRIGHT.

No. 6058.—*Improvement in Carving Machines.*

What I claim as my invention, is the peculiar system of jointed parallel bars, moving frame, or two rack bars in combination with each other and either of the two moving carriages, and made to operate in manner so as to impart to one of said carriages a greater degree of velocity of motion than the other under the circumstances, and for the purpose of moving the tablets or chucks, and making a copy of enlarged dimensions, all as above described.

And I also claim the combination of the two sets of carriages A and B, R and S, and their two sets or systems of parallel bars and moving frame and rack bars, as applied together and combined with the tablets, substantially in manner and for the purpose of imparting to the tablets lateral and transverse movements at different velocities, as specified, and for the purpose as herein before explained.

And I also claim the frame Z, of each tablet, and the mechanism for giving to it a transverse dip or inclination, in combination with its carriage R S, and the rocker shaft and mechanism for inclining and turning the tablet in lateral and other directions, as specified.

HEZEKIAH AUGUR.

No. 6059.—*Improved combined Hinge Fastener and Shutter Opener.*

Having thus fully described the construction and operation of my improved hinge for opening and closing and securing window blinds from the inside of apartments, without raising the sash, I will here state that I do not pretend to be the first inventor of a hinge to accomplish the above named objects by rack and pinion or by screw, but what I do claim as my invention and desire to secure by letters patent, is—

1st. The peculiar manner in which I construct the hinge and propelling rod combined therewith, by which I unfasten, turn back, and secure window blinds, by simply moving the rod outwards, and again unhook, turn and refasten the said window blinds by reversing the movement of the rod without raising the sash in either operation, that is to say, I claim constructing the rod P, with spaces P^5 P^6, in the side and inclined planes P^3 P^4, in the top thereof at the end of the rack, in combination with the inclined planes I J, on the upper half of the hinge, arranged and operating in the manner and for the purpose above described.

2d. I also claim the before described mode of locking the upper and lower parts of the hinge by means of the hook P^2, on the end of the rod P, entering a corresponding groove in the upper part of the hinge—the rod being prevented from rising by being passed through the mortise in the box A, of the lower half of the hinge, by which mode of fastening, the blind is effectually secured against being raised or opened from outside the building, as described. A. S. PELTON.

No. 6060.—*Improvement in Registers for Hot-air Furnaces.*

I do not claim the wheel itself, as new, or a thing by any means patentable, but what I do claim and desire to secure by letters patent, is the application of the upright or vertical wheel to the opening and closing of registers and ventilators, the edge or top of which is placed flush, or nearly so, with the top surface of the register, and can be acted upon with the foot, if desired. This wheel is so placed, and connected to the valves by means of a moveable connecting rod, which rod is suspended upon a pin projecting from the side of the wheel, and connected or attached to the valves by pins projecting from the ends of the valves, at a distance from their centre, substantially as described. CHAS. F. TUTTLE.

No. 6061.—*Improvement in Cooking Stoves.*

What I claim as my invention and desire to secure by letters patent, is the arrangement substantially as herein described of the damper *i*, the flues *i*, and the doors *d d*, for the purpose of cooling the oven and heating the apartment, in which the stove is placed, by promoting the radiation of heat, and the circulation of hot air.

I also claim the arrangement of the damper *k*, by which the hot air in the flue *m*, may be directed into, or around the oven.

EVAN LEWIS EVANS.

No. 6062. — *Improvement in the reduction of Ores.*

Having thus described the nature of my invention, and the best means I am acquainted with for performing the same, I would remark, that I do not confine myself to the precise details herein described, so long as the peculiar character of either part of my invention be retained; but what I claim as my invention, is the above described flux composition to be used in the manufacture of metals, as specified, the same consisting in muriatic acid, or any chemical equivalent therefor, water, charcoal, coal or anthracite, or any carbonaceous equivalent therefor, and caustic lime, magnesian lime stone, baryta, or any alkaline or earthy chemical equivalent, the same being combined and used in the proportions above represented, or in any others which will produce like results. ALEXANDER PARKES.

No. 6063. — *Improvement in Baking Apparatus.*

Having thus described my improvements, I shall state my claims as follows:

What I claim as my invention and desire to have secured to me by letters patent, is a cooking or baking apparatus having several parallel baking chambers, with divided horizontal flue spaces between them, communicating with vertical flue spaces on each side of them, substantially as herein above described, and so as to make the smoke, &c., pass around said chambers, as above set forth. I also claim connecting said chambers with each other, by the combination of the turning registers *c' c' c'*, in their backs with the vertical hollow shaft *d' d'*, in the manner and for the purpose herein above set forth. JOHN P. HAYES.

No. 6064.—*Improvement in Railroad Trucks.*

What I claim as my invention and improvement, and desire to secure by letters patent, is giving to the axis of the wheel such an angle as will join their circumferences in the manner described; secondly, I claim giving to

the flanges any angle which shall be less than a right angle to the bearing faces of the wheel, so that when the wheels are upon the rails in their proper position in the trucks, the said flanges shall project under the concave sides of the rails, in the manner and for the purpose described. Thirdly, I claim the shapes and combinations of the truck frame pieces, so as to form the upper and lower bearings for the wheels, in the manner described and set forth herein. JACOB G. DAY.

No. 6065.—*Improvement in Dumping Cars.*

I do not claim the mode of supporting a car body by means of semicircular arcs or rockers affixed thereto, and made to rest and rock on the top of the truck frame, as the same has heretofore been effected, but that which I do claim, is my improvement or mechanism for sustaining and operating the car body, the same consisting in the rollers or small wheels E F, and their rail or bearing plates as constructed, combined together and with the body and truck frame, and made to operate the car body substantially as above specified. My said invention enabling me not only to construct a dumping car much lower than others in general use, but so low as to be used in trains with common merchandise cars. ALPHEUS NETTLETON.

No. 6066.—*Improvement in the manufacture of India Rubber.*

We here disclaim the use of rubber and sulphur alone, as also the submitting of rubber, or rubber compounds to a high degree of heat, patents having been granted for that process in this and other countries; neither do we wish to secure the right of coloring rubber, such having frequently been done by rubber manufacturers.

But what we do claim and wish to secure by letters patent, is the combination of caoutchouc in its several varieties, with either carbonate of zinc, sulphate of zinc, or the other salts of zinc with sulphur, in manner, form and proportion as herein before set forth. H. G. TYER.
JOHN HELM.

No. 6067.—*Improvement in Cooking Stoves.*

What I claim as my invention, and desire to secure by Letters Patent, is the combination of the perforated registers with the principal and auxiliary ovens, for the purpose of either establishing a communication between them, or separating them as herein set forth.

I likewise claim the combination of the perforated sliding plate *i*, with the plate g′, to open and close a communication between the ovens *d*, *k*, and the flue *e*, the plate g′, also by being removed furnishing a ready means of access to the flue for the purpose of cleaning it. JOSEPH FEINOUR.

No. 6068.—*Improvement in Cooking Stoves.*

Having thus fully described my improvement and its mode of application, what I claim therein as new, and for which I desire to secure letters patent, is the employment of air passages for the purpose of equalizing and economizing the heat in the oven, substantially in the manner described.

I also claim the construction for the introduction of heated air into the oven, as described, and withdrawing the same, and passing it under the grate of the fire chamber to support combustion, substantially as set forth.

I also claim the divisions (*g g*) and (*k*) between the fire chamber and oven, to form the air passages illustrated in the body of the description, substantially as set forth. R. D. GRANGER.

No. 6069.—*Improvement in Cooking Stoves.*

Having thus fully described my improvements, what I claim therein as new, and for which I desire to secure letters patent, is the combination of the tubular grate, or air heating tubes with damper (*b*) below the same, in the manner described substantially.

I also claim the combination of the air-heating grate tubes at the bottom and back of the fire chamber, together with the oblong chamber (*f*) under the smoke flue, for the purpose of conveying air into each end of the oven, by which a greater amount of radiating surface for heating air is obtained with the oven, as set forth, for the purpose of baking by means of heated air, substantially in the manner above described.

R. D. GRANGER.

No. 6070.—*Improvement in Cooking Stoves.*

What I claim as my invention and desire to secure by letters patent, is—

First. The combination and arrangement of the two end flues I and J, with the broad flue D, beneath the oven, and the flues E F, at the back and top thereof.

Second. I claim the combination and arrangement of the flues K^2, beneath the grate with the broad flue D, below the oven, by which the draft may be made to pass down through the grate and under the same in order to kindle from *the top*, by closing the upper register plates M, and the side flues I and J, and opening the central flues K^2, as aforesaid.

JOHN L. GEROW.

No. 6071.—*Improved Lubricating Compound.*

I therefore claim as my invention, the combination of the straits oil with the magnesia and the sperm oil, lard oil, or a mixture of the two, or any oleaginous matter, or matters possessing like powers of non-suspension, the same enabling me to make a very cheap and efficient anti-friction oil to be applied to the lubrication of machinery. A. S. GRENVILLE.

No. 6072.—*Improvement in the manufacture of Vinegar.*

What I claim as my invention and desire to secure by letters patent, is the making of good wholesome vinegar from the slops or swill, commonly so called, being the waste or spent liquors of distilleries, and other manufactories, in the manner and by means of the several processes, substantially as herein set forth.

I also claim the making of vinegar from the combinations of slops or swills, waste or spent liquors of distilleries, breweries, starch manufactories, and other workshops in which vegetable substances have undergone fermentation and partial decomposition, with vinous or alcoholic, or any laceous, saccharine or other vegetable materials added thereto, when employed to increase the strength of vinegar manufactured from said slops or swills, waste or spent liquors, in the manner herein set forth.

I also claim the above described combination of apparatus for effecting the several successive processes of converting the slops or swills of distilleries

and other manufactories, and the mixtures of the same with other materials added thereto, to increase the strength of the vinegar, not confining myself to the precise arrangement herein described, or to any specified number of vessels in which to perform each process, but varying the same as circumstances shall require, while I attain the objects herein set forth by means substantially the same.

JAMES RUGGLES.

No. 6073.—*Compound spring Rock Drilling Machine.*

What I claim as my invention, is the improvement or combination of springs for supporting and operating the drill, the said combination consisting of the two long springs D E, and the two elliptic springs of each long spring, one of the same being *placed above its end and the other below the said long spring*, as described, the said long springs being connected together and made to operate, and simultaneously raise or lower the drill, essentially as above specified. I lay no claim to supporting a drill on or by a spring, or on or by a long bar, or lever elevated by a cam, or other proper contrivance, as I am aware, or think, that in all this there is no novelty, but I rest my claim on the above specified combination of springs for working the drill, as by my combination I not only preserve the drill in a vertical line during its movements, but I avoid the disastrous effects which have been usually produced on the machinery by the percussion or the blow of the drill.

SAMUEL JACK, 2d.

No. 6074.—*Improved Machine for making Suspender Buckles.*

What I claim as my invention and desire to secure by letters patent, is the combination of the cross head with the die L, for forming the buckle, when such cross head is jointed and acted upon by guides, as above described, by means of which I am enabled to bend the wire to an angle a little less than a right angle, for the purpose herein described.

CHARLES A. LENT.

No. 6075.—*Improvement in Flood Fences.*

What I claim as my invention and desire to secure by letters patent, is the manner of fastening the rails to the posts, that in opening they have the full scope of a semi-circle for the current of water to carry them, and on that account will answer for the safety of fences alongside of a water-course, as well as those crossing the water-course in any direction whatever; and also the shape of the mortise in the post, which I cannot describe better in writing than has been done. By examining the model it will appear more plain.

JOHN SOURBEER.

No. 6076.—*Improved Multiple Grate Furnace for Locomotive Boilers.*

What I claim as my invention is the combination and arrangement of two or more fire boxes and the water chamber or chambers between them with each other, and the main boiler and flues when said fire boxes are arranged vertically over each other, the whole being arranged, constructed, connected, and made to operate substantially as above specified, and for the purpose of using anthracite coal and increasing the fire and water surface in boilers whose position is such that it is difficult to extend the fire surface horizontally, and thereby improving the capacity of the boiler to generate steam as set forth.

FREDERICK HARBACH.

No. 6077.—*Improved Hinged Claw Wrench.*

What I claim as my invention and desire to secure by letters patent, is constructing a wrench with a proturbance or cog on its side, and a hinged claw at its end of the form before described and represented in the annexed drawings, in such a manner as to enable a person to grasp and turn screw bolts and nuts of different sizes with the same, as herein set forth, or in any other mode substantially the same.

ADAM HAY.

No. 6078.—*Improved Roller Weather Strip.*

What I claim as my invention and desire to secure by letters patent, is the combination of a roller in a groove, with the bottom of a door or window and threshold with a rebate in it, the said roller having play in its bearings, and the whole constructed and acting as described.

HIRAM C. BROWN.

No. 6079.—*Mill for Rolling Irregular Shapes by means of a Cam Pattern.*

Having thus fully described my improved apparatus for rolling metal to an irregular thickness by pattern, I wish it to be understood that I do not claim moving the top roller up and down by a pattern, that having already been done; but what I do claim as my invention and desire to secure by letters patent, is the employment of cams, as herein described, for elevating and depressing the top roller of a rolling mill, in combination with gearing, the same as above set forth, so that a pattern of any length on the cam may be made to effect the surface of any given length of bar, in proportional ratio, by change of the relative size of the gearing, by which I avoid in rolling long bars any long patterns difficult to handle and expensive to construct.

JOHN S. HALL.

No. 6080.—*Improvement in Cooking Stoves.*

I do not claim the forming chambers or spaces in the side plates of the oven for the admission of heated air, nor do I claim forming horizontal flues, in connection with flues in the doors, as I believe these have been constructed; but what I do claim as my invention and desire to secure by letters patent is—First. The arrangement of the vertical descending and ascending flues I J, constructed in the side plates of the oven, between the oven doors and the corners of the stove, in combination with the flues *g g*, leading from the middle flue G, to the smoke pipe S; and in combination with these I claim the arrangement of the sliding register M, as described and set forth.

W. STEPHENSON.

No. 6081.—*Improvement in Cooking Stoves.*

I do not claim to be the original inventor of a cook stove containing a combination of a large oven placed beneath a fire chamber, having descending and ascending flues, as this is a very old invention, but what I do claim as my invention and desire to secure by letters patent is—First. Making the cook stove with a cylindrical chamber of combustion C, for coal, having a vibratory grate K, at the bottom thereof, arranged above the oven, at the back of the ordinary chamber of combustion, in combination with a rectangular fire chamber B, for the burning of wood, and four descending flues D, two of which merge into a large flue D′, in front, made the full breadth of the stove,

and decreasing in width until it intersects a horizontal flue E, beneath the larger oven made the length and breadth of the stove, leading into the usual central flue G, at the back, said coal and wood fire being used together or separately, as preferred; the front descending flue D' being made to lessen in width as it descends towards the bottom flue, for the purpose of spreading the draft more equally beneath the oven as described.

Second. I also claim extending the oven upward behind the cylindrical coal chamber and the space occupied by the fire chambers, for the purpose of obtaining the radial heat of the convex surface of the cylinder in the upper portion of the oven, as described and represented at L, fig. 4, which shows said extension. JAMES WHITE.

No. 6082.—*Improvement in Tops for Wire Ropes.*

What I claim as new and as my original invention, is the construction of a conical "top," with two or more circles of notches, which vary in depth and extent, so as to suit the passage of the different circles of wires, which are to compose a compound strand, thereby uniting the advantages of a perforated plate with the easy curves of a common top. I also claim the application of one or more rings or bands similar to *f g*, for the purpose of keeping the different circles of wires apart, as well as to keep the wires separate among themselves. The whole arranged and to work in substance as above described.

JOHN A. ROEBLING.

No. 6083. —*Improvement in Cooking Stoves.*

What I claim as my invention and desire to secure by letters patent, is the horizontal ventilating passage between the top plate of the stove and the top plate of the oven, separate from the flue which carries the burnt gases, arranged in the manner and acting to effect the several purposes of ventilation, substantially as herein set forth.

Second. I also claim the air passage leading from the top of the air chamber back of the fire plate, in combination with a ventilator passage independent of a smoke flue constructed and acting to carry away the over heated air from said air chamber, in the manner herein set forth.

Third. I also claim in combination with a horizontal ventilating flue, separate from the smoke flues, and crossing the top of the oven, the ventilating passages in the top plate of the oven having a regulating slide which adjusts the opening into the ventilating flue as herein described.

Fourth. I also claim in combination with a horizontal ventilating passage separate from the smoke flues, and between the top plate of the stove and the top plate of the oven, the front opening I, whereby the front tier of boilers is ventilated without interfering with the position, or with the convenient use of the other boilers, and without mixing their steam with the gases from the fire, and cooling them while passing round the oven in the manner herein set forth, but I do not claim the general principle of conducting away steam by pipes, leading into smoke flues or chimneys. G. B. WHITESIDE.

No. 6084. —*Improvement in machinery for Spinning Hemp.*

What we claim, therefore, as our invention, is the combination of levers *z* and *z*, or any mechanical equivalent or equivalents, a screw *d'*, and weight *s'*, or any mechanical equivalent or equivalents therefor, and the pulley S, and

friction plate V, the whole being applied and operated together, and so as to actuate the bobbin substantially in the manner and for the purpose as specified.

WILLIAM PEDRICK.
THOMAS M. MELVIN.

No. 6085. — *Improvement in Hoisting Apparatus.*

What I claim as my invention, is the friction disk B, the driving wheel D, and the system of levers or leverage applied thereto, as combined together, and with the hollow windlass barrel, and made to operate substantially as specified, and I also claim the combination of the same, and the spring weighing apparatus, which serves not only to present to the action of the friction apparatus, under certain circumstances, the relief of a spring, but also to determine the approximate weight of a body raised by the machinery.

ELIJAH LEARNED.

No. 6086. — *Improvement in Cooking Stoves.*

Having thus described the construction and arrangement of my improved premium stove, what I claim therein as new, and desire to secure by letters patent, is the combination of the diving pipe *i*, with the flues F, arranged as herein described, for the purpose of evenly distributing and equalizing the heat on the four sides of the oven, without using or requiring dampers, as herein set forth.

ELISHA VANCE.

No. 6087. — *Improvement in plates for Boiler holes and tops of Stoves.*

What I claim as my invention and desire to secure by letters patent, is the application of a hollow shell of cast iron as a protective plate in connection with the holes A A, to centre or cross pieces for cooking stoves and ranges as described above.

JOHN B. CHOLLAR.

No. 6088. — *Improved method of boring gun-barrels.*

What I claim as my invention, is the above described mode or process of boring gun barrels, or articles of like character, the same consisting in using the three drills X Y Z, in the order and manner specified.

HENRY PEELER.

No. 6089. — *Improvement in Cooking Stoves.*

I do not claim the construction of air flues or passages, whether below or back of the fire chamber, nor hot air flues surrounded by fire or heated gases as original with me; but I claim the special combination and arrangement of hot air and fire, and heated gas channels and flues in connection with the heating and culinary apparatus of a cooking range or stove as herein described, not limiting myself narrowly to the proposition nor precise form of parts set out in this specification.

WILLIAM COBB.

No. 6090. — *Bolt and disk; Sectional Cannon.*

What I claim as my invention and desire to secure by letters patent, is the combination of metallic plates and bolts in the manner above described, to construct a cannon.

JESS. FITZGERALD.

No. 6091.— *Improvement in Rotary Cutter Ploughs.*

What I claim as my invention and desire to secure by letters patent, are the rotary cutters K K, and screw shaft I J, in combination with the wheel and handle shafts arranged in the manner and for the purpose herein described. THOMAS J. TUTHILL.

No. 6092. — *Adjustable Lever Cut-off, with secondary Toe, No.* 2.

What I claim in this invention and combination is,

First. The use of a secondary toe G, having a fixed centre, which toe is moved by a motion taken from the usual rock shaft, and is lowered by a motion coincident with that of the piston, and by means of which the valve can be raised and returned to its seat at any portion of the stroke without concussion.

Second. The use of a double fulcrum lever K, the ends of which are alternately sources of motion and fulcra, and by means of which in combination with motions which are nearly at right angles to each other, the valve will be raised at the commencement of the stroke and then restored to its seat at such part of the stroke as the adjustment provides for.

Third. The use of the adjustable piece Q, by means of which the proportion of cut-off is changed.

Fourth. The mode of working the steam valve by the combination of the secondary toe G, lever K, adjustable piece Q, and arm N, substantially as set forth in this specification. HORATIO ALLEN.

No. 6093.—*Adjustable Lever Cut-off, with secondary Toe, No.* 1.

What I claim is the combination of the lever K, adjustable piece Q, and toe G, with the lifting rod B, by means of which the valve is raised at the commencement of the stroke, and the combination of the lever K, link M, and arm N, with the cut-off rock shaft O, by means of which the valve is lowered to its seat, substantially in the manner herein described.

HORATIO ALLEN.

No. 6094.—*Improvement in Music Stands.*

What I claim as my invention and desire to secure by letters patent, is the combination and arrangement of an apparatus with the music or book stand, which apparatus consists of the connecting bar (*b*), crank (*g*) and the second crank to slide the catch bar (*f*), constructed and operating as herein described and set forth. HENRY W. HOLLY.

No. 6095.—*Improvement in cutting Boot Heels.*

What I claim as my invention, is a combination composed of the following elements, viz: the inclined plane or bed, the curved cutters and machinery for deprressing them and expanding or separating them during their descent, the whole being constructed and made to operate substantially as specified, not meaning to confine each or any member of the said combination, to the exact form, shape, or construction, as described and exhibited, while it may be possible to vary the same without any substantial change of the whole combination, but to employ any machinery which may be considered a mechanical equivalent for such member.

And in combination with the bed and cutters, I claim the bent lever O, or any mechanical equivalent, the same being for the purpose as herein before explained.

PHILANDER SHAW.

No. 6096.—*Piston Valve inclosed in the Steam Cylinder.*

What I claim as my invention and desire to secure by letters patent, is the employment of the two sliding ring valves G G, in combination with the cylinder A, and reciprocating piston K, for admitting the steam *to* and discharging it *from* the cylinder in reciprocal succession, by the alternate direct action of the piston on the ring valves, and without the intervention of any other agents, whether the valves be connected in the manner described or in any other way, which is substantially the same, and by which analogous results are produced.

ISAAC L. BENNETT.

No. 6097.—*Improved Lever Scale for Canals, Railroads, &c.*

We claim nothing new in principle from the original knife edge lever, or platform scale, first made by Thomas Ellicott, (now deceased,) and since by ourselves and others; but what we claim as our invention and desire to secure by letters patent, is the combination with each other of two or more simple horizontal levers placed on each side of the top, or base of lock, canal, dock, railroad, or other desired place, and running parallel thereto, by which means the scale may be extended to any length, from the smallest to the greatest, with entire accuracy, and by the multiplication of said levers can be obtained a scale strong enough for any purpose, the whole operating substantially as above described. We also claim the connection between the said parallel levers and the graduated beam, as above described, by means of a rod or rods and bell cranks.

ELY ELLICOTT.
SAM'L. A. ABBOTT.

No. 6098.—*Improvement in Dumping Wagons.*

What I claim as my invention and desire to secure by letters patent, is the arrangement of the cavities *c* and *n*, in combination with the friction rollers *m* and *x*, substantially as herein described, whereby the box is moved backward and forward (preparatory to and after tilting its load) easily and with but little friction, and when in place rests upon and in contact with the sides of the frame throughout its entire length, which greatly increases the strength and durability of the wagon.

WM. H. START.

No. 6099.—*Improvement in Sewing Machines.*

In the above machine we claim as our invention the combination of a needle *a* and a hook *t'*, as constructed and made to operate together substantially in the manner and for the purpose of sewing cloth, or any other material or materials capable of being sewed, as specified.

CHARLES MOREY.
JOSEPH B. JOHNSON.

No. 6100.—*Improvement in Ploughs.*

Having thus fully described the manner in which I construct, arrange and combine the respective parts of my plough, what I claim therein as new and desire to secure by letters patent, is—first, the employment of what I have

denominated the auxiliary furrow side, forming a broad bearing at the heel of the mould board, which is to be formed and combined with the plough, substantially as described, either in one piece with the mould board or by an additional casting. I also claim the fastening of the cutter C, extending down on the land side to the bottom of the plough, in the manner and for the purpose set forth, by means of a mortise through it that receives the tenon *b'*, on the wrought iron plate D, and which plate is bolted to the mould board at *c'*; I claim the particular manner in which I secure the point and share to the cutter by means of the plate D, having a tenon *b'*, thereon, and the ordinary screw bolt as described.

JOSEPH C. CLOUD.

No. 6101.—*Improvement in Cheese Presses.*

What I claim as my invention and desire to secure by letters patent, is the combination of the spring with the screw and toggle joint, as herein set forth, or in any other substantial similar manner, by which the same effects are produced.

LANSING KELLOGG.

No. 6102.—*Improvement in Coloring Bricks.*

I do not claim the mixing of clay with the coloring materials, for the purpose of coloring bricks, as that has been done before, but what I do claim as my invention and desire to secure by letters patent, is the peculiar process and manipulations of mixing coloring materials with the moulding sand for the surface of bricks, and the pressing the same upon and into the surface, so as to produce bricks of a uniform color upon the surface, as well as of a uniform shape and smoothness, the same being effected with greater economy than by mixing a sufficient quantity of coloring matter to color the whole body of the brick, and this regardless of any particular coloring matter or especial color to be produced when the bricks are burned, all of which is herein described and set forth.

CYRUS B. DOTY.

No. 6103.—*Improvement in Camphine Lamps.*

Therefore, that which I claim as of my invention, is the manner in which I construct the fountain, in order to allow the rays of light proceeding from the wick of the burner to pass downwards through both the internal and external concentric sides or shells of the fountain; that is to say, I claim an internal translucent side or shell in combination with an external concentric translucent side or shell, whether the said two concentric translucent sides of the said fountain be connected together by a translucent or opaque bottom.

EDWIN B. HORN.

No. 6104.—*Apparatus for ascertaining by inspection the saltness of water in Steam Boilers.*

Having thus fully described my improvement, what I claim therein as new and for which I desire to secure letters patent, is the employment of a cylinder containing a hydrometer, and with or without a thermometer, said cylinder being connected with a steam boiler, and constructed and arranged substantially as set forth, with a current of water passing from the boiler through it, which is kept always at the same height in the cylinder, by means of a waste pipe, as above described; and I further claim connecting said cylinder with

he interior of the boiler by more than one pipe at different levels, so that the altness at any level can be determined, substantially in the manner set forth.

WM. SEWELL, JR.

No. 6105.—*Method of regulating the supply of water to Steam Boilers.*

Having thus described my self-acting apparatus for maintaining the water n steam boilers at a uniform height, I here declare that I do not claim the float s part of my invention, the same having before been known and used in team boilers; neither do I claim the chamber in which said float is placed, or the crank on the float rod, nor in fact any such apparatus for regulating ne height of water in boilers where motion is communicated directly to the ock-stem or valve spindle by the float, various modifications of such appara-us being well known.

But what I do claim as my invention and desire to secure by letters patent, regulating feed in boilers by means of an arrangement of a float, a rocking haft kept in constant motion by the engine, vibrating clicks, and circular or traight ratchets, acting upon the cock-stem, valve spindle, or pump shaft, so nat the float is required to exert no direct force to regulate the supply; the whole machinery constructed and acting substantially as above described.

WARREN S. BARTLE.

No. 6106.—*Improvement in Wire Fences.*

I claim constructing the wrought iron wire fence substantially as herein lescribed, that is to say, by forming the top and bottom rails and posts of the annel of grooved bars, through which the ends of the wires of which the neshes are made are drawn and the ends turned down into said grooves, and hen covered by other similar bars to hold them in place, by which a perfect inish is effected, and the expense and difficulty of riveting is avoided.

HENRY JENKINS.

No. 6107.—*Improvement in apparatus for heating by Vapor of Alcohol.*

Having thus fully described my apparatus for the economical use of fuel or heating purposes, what I claim therein as new and for which I desire let-ers patent, is the combination of a reservoir for holding the material to be urned, having a tube running through it in any convenient direction, with one r more small pipes or burners leading from the top thereof, and introduced in n angular direction near the bottom, as set forth, so as to cause the blaze herefrom to impinge on the side of the tube, the heat of the blaze causing a ufficient and constant supply of vapor to the burners, without the aid of an uxiliary heater, and all the surplus heat being directed through the tube to the op thereof for heating purposes.

I also claim, in combination with said burner or burners, one or more jets eading into the current issuing through the tube for increasing the heat, as erein specified.

THOMAS K. ANDERSON.

No. 6108.—*Improvement in self-acting Presses.*

We do not claim to be the first who have employed the gravity of a press, and that of the substance being compressed by it as its actuating force, this having been done by others in various ways; but what we do claim as our

invention and desire to secure by letters patent, is the combination of the cam lever *d*, and head *h*, constructed and arranged as herein described, with the platen, press beams, and parallel levers, whereby the platen is maintained in a horizontal position at every elevation, and the compression effected by the lever and cam, without passing pins through them as fulcra for them to turn on, thus avoiding the splitting of the levers and other arrangements, which are productive of so much inconvenience in presses heretofore constructed upon similar principles.

DAVID TYLER.
A. McKINNEY.

No. 6109.—*Improvement in Door Locks, by which one key hole serves for two distinct Keys.*

I therefore claim as new and of my own invention and desire to secure by letters patent of the United States, the application of such a key hole to receive a different key at each end, such keys acting singly or successively to withdraw or project the night or standing bolt, or act upon the latch bolt by the intermediate slide (*c*), as these are all applied and conjoined for these purposes, substantially as described and shown.

AMOS CALL.

No. 6110.—*Improvement in Compositions for Filling Teeth.*

We do not claim as our invention and discovery, the application of gutta percha alone to the stopping and filling of carious teeth, although we are not aware that it was ever so used until we commenced using it; but what we do claim, is the combination of gutta percha as a base with such other mineral, earthy, and metallic substances as will make such a compound, of such a character, and adapted to such purposes as we have described, viz: its combination with such of those substances as will shorten it and render it less tenacious, harden it and render it fit for a useful filling, and give it the desired color without any noxious quality and without destroying its plasticity when heated, and the application of the compound substance for that purpose.

ASA HILL.
SAMUEL G. BLACKMAN.

No. 6111.—*Improved Combination Revolving Tumbler Lock.*

What I claim as my invention and desire to secure by letters patent, is the combination of the sliding bolt with the rotating tumbler, substantially as described, for the purpose of locking the tumbler independently of the permutation stops, as described.

I also claim the turning plate, in combination with the sliding bolt and tumbler, substantially as described, by means of which the motions of the sliding bolt are regulated, and its combination with the tumbler effected, substantially as described.

I also claim, in combination with the tumbler and the sliding bolt, the employment of a key, which when inserted, will permit the sliding bolt, in unlocking the tumbler, to close up the key hole over the key, substantially as herein described, by means of which combination the tumbler must be locked to admit of inserting the key, and the key must be shut into the key hole to admit of unlocking the tumbler, substantially as herein described.

And finally, I claim, in combination with a rotating tumbler and the sliding

bolt by which it is locked and unlocked, the employment of the turning eccentric plate, which operates the sliding bolt, and at the same time also closes up the key hole, substantially as described.

LINUS YALE.

No. 6112.—*Improved Nipper Saw-set.*

What I claim therefore as my invention, is the improved organization above described, or in other words, the hand rest or handle B, the arm I, and screw K, the spring lever L, the jaws or bed A, and jaw *b*, of the lever L, the adjustable bed screw and arm C, in combination, the whole being constructed and made to operate together, substantially as specified.

JACOB MUZZY.

No. 6113.—*Improvement in Apparatus for removing Animals from Railroads.*

What I claim as my invention and desire to secure by letters patent, is—

First. The manner of avoiding destructive violence to the limbs and bodies of animals, by terminating the fingers of my machine with elastic rollers, rendering the fingers capable of a limited vibration to suit the action of those rollers, and placing above the fingers a moveable elastic cushion or buffer to receive the direct action of the animal, which may be thrown upon the fingers, substantially as herein set forth.

Second. I also claim making the front part or fingers of an oscillating life preserver, to raise by the act of encountering an animal on a railroad, in such manner as to lift the animal from its feet clear of the track, whereby the life and limbs of the animal are preserved, and the danger of throwing the train from the track is avoided, substantially as herein set forth.

Third. I also claim the arrangement of machinery herein described, composed of the cushion C, the sliding rods *g g*, the thrusting bar M, the trigger T, the latch bar D, the latch *o*, and the notch *q*, combined and acting to produce the effect of elevating the fingers of the railroad life preserver, when encountering an animal on the road, substantially as herein set forth.

Fourth. I also claim the arrangement whereby the fingers of a life preserver are, while in motion, made to receive at pleasure a limited horizontal deviation from their ordinary line of direction, in order to arrest an animal near one side of the track, the same being effected substantially as herein set forth.

Fifth. I also claim, in combination with the T shaped frame and weighted oscillating frame of my life preserver, the jointed fingers, folding backwards, and the jointed rack frame and cushion withdrawn and folding forwards, to produce a compact stowage when in depot, in the manner substantially as herein set forth.

Sixth. I also claim the jointed revolving and elastic life preserver, herein described, combined with a pivot truck, having a circular bearing for friction rollers, and also having check arms for producing and limiting the horizontal motion of the fingers, substantially in the manner herein set forth; not intending by these claims to limit myself to the exact arrangement of parts herein described, but to vary the same at pleasure, while I attain the same ends by means substantially the same.

LOUIS MONTGILION.

No. 6114.—*Improvement in Setting Teeth.*

What I claim in the above described improvement as new and useful and desire to secure by letters patent, is the *mode and manner of securing the cylinder in its place*, by means of the perforated or solid screw passing through the bottom of said cylinder into an opening in the root of a tooth prepared to receive it.

F. H. CLARK.

No. 6115.—*Improvement in Water Wheels.*

What I claim as my invention and improvement and desire to secure by letters patent, is making the shell A, of the wheel, of the peculiar form described and represented, in combination with the circular plate B, central core C, and spiral buckets D D, discharging on the same side of the shell, arranged and operated in the manner and for the purpose herein set forth.

JAMES TREES.

No. 6116.—*Improvement in Spark and Gas Consumers.*

Having thus fully described the manner in which I construct my spark and gas consumer, and shown the manner in which the same operates, what I claim therein as new and desire to secure by letters patent, is the manner in which I have constructed and arranged the respective parts that constitute the inner and outer cases of the apparatus which is placed at the top of the chimney, and also the manner in which these are combined with the fire box; that is to say, I claim the manner of constructing and arranging the trumpet mouthed tube D, within the inner case, said tube being divided into two or more parts, and being made to deposit and discharge the larger portion of the sparks by the aid of the opening between said parts as described, substantially as set forth. I also claim the manner in which I connect the apparatus at the top of the chimney with the furnace or fire box by means of the tube or pipes H, the cases L L, and the openings thence into the fire box or furnace for the purpose made known. I likewise claim the manner of preventing the entrance of water into the fire chamber by the employment of the tubes M, in combination with the tubes H H'.

DAVID MATHEW.

No. 6117.—*Improvement in the Manufacture of Pearlash.*

What I claim as my invention, is the process of first roasting or heating the ashes, once dissolving and then pearling in the pearling oven, thereby saving the expense of the leeching apparatus and one boiling operation, in the manner described in the specification.

WM. A. EDWARDS.

No. 6118.—*Improvement in Apparatus for Warming Apartments.*

What I claim as my invention, is the combination of the vapor condenser with one or more radiators and the water chamber surrounding the furnace, also the arrangement of the said condenser and air inlet and outlet pipes of its external case, in such manner that the cold air, previous to its entrance into the air heating chamber, shall be brought to impinge directly against the condensing vessel.

I also claim the above described mode of making one or more of the sides of the radiator M, viz: serpentine in transverse section, essentially in manner and for the purpose as specified.

SAM'L WHITMARSH.

No. 6119.—*Improvement in Drying Machines.*

What I claim as my invention and that for which I desire to secure letters patent, is for a wheel divided into chambers, as described, open to the free circulation of the atmosphere around the periphery and through the passage P P P P, around the interior parts of the chambers, also for the purpose herein set forth. I do not confine my claim to the chambers formed of iron wires or rods, for some purposes wood would be preferable, neither do I confine my claim to four chambers in the wheel, but to two or more formed as described.

NELSON E. CHAFFEE.

No. 6120.—*Improved Block for supporting Bilges and Keels of Vessels.*

What I claim as my invention and desire to secure by letters patent, is the combination of the two legs and the horizontal table supported by them, with the palls at their feet, and the rectangular frame and its palls and ratchet, the whole to be acted upon by devices for giving a coincident motion of the legs towards each other, and constituting a support for the bilge or keels of vessels when taken in dock, not intending to limit myself to the precise form and number of the parts, or to the exact size as described, as it is obvious that four legs may be used instead of two, or that the number of palls and ratchets may be multiplied.

FRANCIS GRICE.

No. 6121.—*Improved Electro-Magnetic Ore Separator.*

What I claim as my invention and which I desire to secure by letters patent, is—

First. The use and application of a revolving cylinder or drum, with the poles of electro-magnets on its periphery, for and to the purpose of separating the magnetic oxide of iron from the substances with which said oxide may be found associated, by causing the said electro-magnets when revolving as component parts of such cylinder, to be successively charged to take up the ore and subsequently discharged to part with it, the charging being effected by bringing the windings of such electro-magnets in connection with an acting galvanic battery, and the discharging by breaking or leaving such connection.

Second. For the purpose of separating such ore, I likewise claim the use and application of four or more terminations to the poles of electro-magnets, as shown in fig. 3.

RANSOM COOK.

No. 6122.—*Improvement in Artificial Legs.*

What I claim as my invention and desire to secure by letters patent, are:

First. The combination of the horizontal arm with the knee bolt, connected with a cord and spring in such a manner as to possess a varying tendency to extend the flexed limb according to the position of the same, substantially as herein specified and described.

Secondly. I claim the use of a combination of the double coiled, recurved foot-spring with a bolt, and with downward and backward projecting arms, acting at once to flex the foot, and to extend the toes as herein set forth.

Thirdly. I claim the use of a combination of the stop bolt with a moveable heel as herein specified.

Lastly. I claim the manner herein described of connecting the toe-piece

with the foot when the said toe-piece is operated on by the cord *e*, and spring Q, to extend it in the manner and for the purposes herein set forth.

BENJ. F. PALMER.

No. 6123. — *Improvement in Horse Rakes.*

What I claim and desire to secure by letters patent, is the application of the crank levers D, D, and handle E, F, E, for rotating the rake-head in the manner and for the purposes described, for charging and discharging the rake.

SAMUEL H. GRINNELL.

No. 6124. — *Improved attachment of loading muzzle for Rifles.*

What I claim as my invention and desire to secure by letters patent is,

First. The hinge attachment for connecting the muzzle to the barrel.

Second. The application of the muzzle to and for the use of the muzzle thimble for the ramrod.

DANIEL SMITH.

No. 6125. — *Improvement in Fire-kindling materials.*

I make no claim to the use of turpentine in its crude or native state, as the great quantity of essential oil in proportion to the resin therein, prevents me from making a composition possessing the desirable qualities as above enumerated; but what I do claim, is the combination and use of the spirits of turpentine with the charcoal and other materials herein named, for the purpose of so softening the resinous materials of the composition as to enable them to adhere with tenacity after compression, and thereby to sustain the shocks incident to transportation, without fracture.

LEVI T. CHEEVER.

No. 6126. — *Improved method of attaching the arch to the Truss frame in Bridges.*

I do not claim as my invention the combination of an arch or arches with a truss frame, as this has long since been known; but what I do claim as my invention and desire to secure by letters patent, is combining the arch or arches with the truss frame by attaching it or them to the posts alone (in contradistinction to the diagonal braces) when the said posts are so connected with the chords as to admit of drawing them together without changing the position of the arch or arches, and of changing (by the same means) the position of the arch or arches relatively to the chords substantially as described.

J. DUTTON STEELE.

No. 6127. — *Improvement in Brick Presses.*

I do not claim any of the component parts of this machine, individually considered, nor do I claim the mixing tub and knives as used in making bricks or otherwise, but what I do claim as my invention and desire to secure by letters patent is,—

First. The combination and arrangement of the two horizontal circular revolving mould plates M, M, for moulding the brick with the tub B, revolving shafts and pressers H′, and conveying the brick to the discharging pistons *d*, *d*, simultaneously in opposite directions, the gearing being so arranged as to cause the rotating mould plates and reciprocating pistons to have the motions and pauses as herein set forth, for moulding and discharging the brick.

VALENTINE ROTH.

No. 6128. — *Improvement in short-slide valves by chamfering the corners.*

What I claim and desire to secure by letters patent, is the rounding or flattening of the corners, joining the sides of the steam ways in and the outer ides of the seat of the valve with its face; also the face of the valve or slide eing joined to the sides of the steam cavity therein, and to its outer sides y corners rounded or flattened in the manner and for the purposes herein set orth.

JAMES MULBURY.

No. 6129. — *Improvement in self-acting Registers for stoves.*

What I claim as my invention and desire to secure by letters patent, is the rranging and combining the respective parts of my improved stove registerng apparatus with each other, and with a stove in such a manner that the exansion and contraction of the stove itself (or the portion of it with which ıe registering apparatus is combined) shall operate the register or damper late, and thereby regulate and govern the admission of air to the chamber of ombustion; not intending by this claim to limit myself to any particular ›rm of the respective parts of the registering apparatus, but to vary them as may deem expedient, whilst I attain the same end by substantially the ame means.

WASHBURN RACE.

No. 6130. — *Fluid Metre.*

What I claim as my invention and desire to secure by letters patent is,—

First. The within described machine or mechanical combination for the ıeasuring or ascertaining the cubical, or other quantity of a fluid, that may ass, or be forced by mechanical or other means through it, with the self reistration of the same, by means of a counter or other suitable contrivance, ranged and operating substantially as described; but I do not intend by ıis specification to limit myself to the precise arrangement of parts herein escribed, intending to vary it in any manner whereby results substantially ıe same to those herein described are produced.

Secondly. The making or leaving a sufficiency of space above or beyond ıe port leading into the chamber N, in the cylinder F, to allow of the piston , to pass above or beyond the port, or any portion of it with the object or ıtent of providing an escape for the fluid forced into the cylinder from the ed pump, in case of the metre failing to act from an accident, by breaking f the rods, or from other causes.

Thirdly. The use of the pneumatic pump, or pumps, or springs, whether of ıetal or other material, for the purpose of assisting the return of the piston , during the exhaust or upward stroke of the feed pump plunger, substanally in the manner and for the purpose herein described.

WM. HENRY LINDSAY.

No. 6131.—*Improvement in Machinery for turning right and left Lasts, &c. from the same pattern.*

What I claim as my invention and improvement and desire to secure by tters patent, is the herein described arrangement and combination of the ibrating beam and cutter wheels with the revolving centres, so as to proıce at one time and from one pattern a right and left last, or a series f right and left lasts, or work of like character, substantially in the manıer set forth herein.

SAMUEL HUNTINGTON.

No. 6132.—*Improvement in Apparatus for Current Wheels.*

What I claim as my invention and desire to secure by letters patent, is the manner of regulating the action of my re-action current wheel, by combining it with a wicker gate, of which the opening is regulated, held stationary or inverted with an inversion of current, in the way and for the purposes herein set forth.

I also claim the combination of vertical wings having inclined flanges passing under the floor of the channel leading to my mill, with the reversible wicker gate above described, substantially in the manner and for the purposes herein set forth.

I also claim the combination of machinery, by which I hold stationary the wheels of the governing apparatus of my wicker gate, not confining myself to the exact arrangement of parts herein set forth, while I effect the same purposes by means substantially the same.

JAMES SECOR.

No. 6133.—*Improvement in Churns.*

What I claim as my invention and desire to secure by letters patent, is the combination of the hollow cylinder dash B, perforated around its periphery near its lower or open end, with a number of small apertures for the air to pass through, and the central guide spindle D, and stationary cylindrical central block E, over which the cylindrical dash works, with the ordinary upright tub-churn A; the several parts being made, arranged and operated substantially in the manner and for the purpose above set forth.

CHARLES MURDOCK.

No. 6134.—*Improvements in Machinery for turning Irregular Forms.*

I therefore claim the above described manner in which I construct and operate the cutters of my improved machine, the same being represented in figures 5, 6 and 7, not meaning to claim cutter wheels as made and operated in the manner adopted by the said Blanchard, or as made to rotate in vertical planes passing respectively through the axis of the blocks to be cut or reduced.

I also claim the vibrating frame *h*, its shaft, pulleys and bolts in combination with the driving shaft and its driving pulley, the cutter carriage and its drums or pulleys U U U, the whole being made to operate together substantially in manner and for the purpose of imparting to the cutters a continual revolving power during the reciprocating rectilinear movements of the cutter carriage, as specified. And, furthermore, I claim in combination with the mechanism as above described for cutting or reducing the wood or block as specified, the mechanism by which said wood or each block and the pattern are partially and simultaneously rotated at regular intervals of time, for the purpose of bringing the cutters to act on a fresh surface or surfaces of the wood or block; the said mechanism consisting of the gear wheels on the pattern and block mandrils, the worm gears or screws, the shaft H, the pulley c', and spring pall e', the ratchet wheel, the weighted cord b', lever z, stop d', and projections $x\,y$, from the pulley r, the whole being constructed and made to operate substantially as specified. And although I have described and claimed certain improved mechanism, I do not intend to confine or limit my invention to the precise form or forms as above specified, but to vary the said

form or forms in any manner and to any extent so long as I do not change the principle or principles of operation of my said improvements.

JAMES M. EDDY.

No. 6135.—*Improvements in Carding Engines.*

What I claim as my invention and desire to secure by letters patent, is the *cylinder A, surrounded or clothed with a spiral fillet of metal teeth,* in form of wire, or with teeth of metal of the form and description mentioned and described on the fourth specification, as arranged and employed in the third and fourth specifications, *in combination* with the main cylinder C, and with the cylinder B, or with the main cylinder only to *strip* and *clear* the *latter* by a self-acting contrivance, whilst the carding engine is in operation. I also claim the cylinder B, in combination with the cylinder A, and the main cylinder C, as applied to receive the strippings from the former and to deliver them to the latter.

J. DYSON.

No. 6136.—*Improved Cartridge Tube and Conveyor, forming a Fire-arm.*

Having thus fully described my improvements in fire arms, what I claim therein as new and desire to secure by letters patent, is—

First. The cartridge tube constructed substantially in the manner and for the purpose set forth; I also claim the tube *f*, for conducting the cartridges into the barrel, as above described.

Secondly. I claim the follower (*r*), for forcing forward the cartridges in the cartridge tube, in combination with said tube, in the manner set forth.

C. W. BUCHEL.

No. 6137.—*Improvement in Cooking Stoves.*

Having thus fully described my improved stove, what I claim therein as new and for which I desire to secure letters patent, is—first, the combination of the air chamber below the oven and the moveable pipe for conveying off the hot air, as above set forth. And lastly, I claim, in combination with the double flues, the projection (*m*) rising above the back flue before it contracts into the size of the pipe, arranged substantially in the manner and for the purpose herein made known.

JAMES L. NORTON.

No. 6138.—*Improvement in Flood Fences.*

I do not claim to be the original inventor of a hinged falling panel for a flood fence; but what I do claim as my invention and desire to secure by letters patent, is the combination of the hinged falling post B, with buoyant notched levers C, for letting down the panels by the rising of the water, acting on said buoyant levers, constructed, arranged, and operated substantially as above described for the purpose set forth.

I also claim the combination of the spring F, with the panel for holding the panel when thrown down by the flood, to prevent its being raised by the rising of the water as above described.

HENRY REICHERT.

No. 6139.—*Improved detached metallic Cartridge Tube, &c., for Fire-arms.*

What I claim as my invention and desire to secure by letters patent is—First, the hinged holder H, and cap I, in combination with the frustrum of

a cone metallic cartridge tube A, constructed, arranged, and operated in the manner and for the purpose above set forth.

DAVID MINESINGER.

No. 6140.— *Improved machine for dressing Nuts and Bolt-heads.*

Having thus described the construction, operation and comparative advantages of my machine for dressing the sides of bolt-heads and nuts, what I claim therein as new, and desire to secure by letters patent, is the combination of the twin cutters with the sleeves or other equivalent device for gauging their distance apart, and with the mandril upon which they are mounted, whereby the sides of nuts and bolt-heads are finished in less time, and with a machine of less size and cost than where only one cutter is used.

JULIUS KING.

No. 6141. — *Improvement in Presses.*

I do not claim the invention of a toggle joint press, but what I do claim as my invention and desire to secure by letters patent is,—

First. The before described combination and arrangement of the pulleys *n*, rope *p*, and central vertical shaft *o*, by which the power is applied beneath the centre of the follower in such manner that the rope in winding on the shaft, will not ride or touch the adjacent coils, and consequently will not be liable to wear, rub, or chafe — said rope being in a single length conveyed through an opening *o'*, in the shaft, and attached by its extremity to the connecting pins *m*, of the two toggles—the pulleys around which the rope is passed being arranged in pairs on the horizontal joint, or connecting pins *m*, of the toggles, outside the same, by which arrangement their diameter can be increased or diminished at pleasure, and the shaft being of the diameter of the width apart of the pulleys, so that the rope shall be drawn in straight parallel lines as described, to prevent rubbing against the flanges of the pulleys.

Second. I also claim the combination and arrangement of the hinged shutters L, with the followers for shutting the bagging and ropes into corresponding depressions in the sides of the same, so as to prevent them from getting out of place whilst the follower is descending as before described, preventing entanglements and derangement of the ropes and ends of the bagging in lowering the follower into the box.

Third. I likewise claim making the drag in the form of a segment of a circle, with a joint and key arranged and operated in the manner and for the purpose herein described and set forth.

Fourth. I also claim inclining the four hanging posts of the frame *b*, inward, by which the shoes *i*, of the toggles are sustained perpendicularly under the outer ends of the follower *l*, whilst the required length and width of the cotton box is obtained.

D. McCOMB.

No. 6142.— *Protector Slide for Door Locks.*

What I claim as my invention and desire to secure by letters patent, is the application to the ordinary rim lock, of a metal slide, which will at the same time cover the key hole, protecting the lock from being picked or opened from the outside; prevent the key from being turned by the application of instruments to the *pin*, or its dropping out by the slaming of the door, and retain

the knob spindle in a fixed position, rendering it inoperative upon the latch, thereby converting the latch into an additional bolt.

GEORGE F. J. COLBURN.

No. 6143.—*Improvement in Weavers' Temples.*

We claim as our invention the combination and arrangement of the following parts, viz: 1st, the jaws; 2nd, the arm B, and its joint pin; 3d, the lever G; 4th, the spring D; 5th, the tablet or support piece A; 6th, the arm I, with its spring M, and stud N; the whole being constructed and applied together as described, and so to operate essentially as above specified.

LEWIS K. DAY.
PRESTON DAY.

No. 6144.—*Improvement in Jaw Temples for Looms.*

What I claim as my invention is the cam *i*, and lever *f*, (applied to the breast beam) in combination with the inclined plane or cam *e*, projection K, or any mechanical equivalent therefor as connected with the lay D, the whole being applied to the temple and made to operate substantially in manner as above specified.

GEORGE DRAPER.

No. 6145.—*Improvement in Gas Apparatus.*

What I claim as my invention and desire to secure by letters patent is, firstly, the ribs or flanges *l*, around the retort; second, the passing of the lower end of the retort through the fire grate *m*, so as to connect it directly with the condenser; and thirdly, the immersing of the lower end of the retort in water or other suitable fluid; all of which being constructed, arranged and operating substantially in the manner and for the purposes herein above described.

AMARIA PIERCE.

No. 6146.—*Improved Metallic Packing for Pistons.*

What I claim as my invention and desire to secure by letters patent, is the making of metallic packing for the pistons of steam engines, of two cut rings, one within the other, the outer and the inner peripheries of the compound ring being concentric, and the division between them eccentric, substantially as herein described. When this is combined with the mode of keeping the two rings with their thickest parts on opposite sides of the common centre, by the projecting pin attached to the outer ring and the plate embraced by the ends of the outer ring, to cut off the passage of steam, substantially as described.

WM. WRIGHT.

No. 6147.—*Improvement in the manufacture of Hubs and Axles.*

What we claim as our invention and desire to secure by letters patent, is the method, substantially as herein described, of making the hubs of carriage wheels, by forming the inner box and outer case or surface of sheet metal, and uniting them by filling the inner space with cast iron, by running the molten iron in between them, as described; and in combination with this method of forming the hub, we also claim the method of securing the spokes by inserting their inner ends in the outer case of the hub, that the cast iron within the hub may run around and secure them in place, substantially as described.

And we also claim the method of forming the axles of carriages, by making

the outer form of the arm of the axle of sheet iron, when this is united to the steel or wrought iron axle within, by means of iron cast in the space between the two, substantially as described.

STEPHEN R. HUNTER.
MEAD MERRILL.

No. 6148.—*Improvement in machinery for separating Flour from Bran.*

Having thus fully described the construction, arrangement, and operation of the several parts of our machine, we will now add that we do not mean to claim to be the original inventors of a cylinder, nor of a combined punched and reticulated cylinder, nor of a cylinder covered with strips of punched sheet iron and strips of leather filled with tacks, such as are used in smut machines, nor the arrangement of gearing by which the machine is propelled; but we do claim to be the original and first inventors of the combination and arrangement of the external upright stationary close cylindrical case B, with the internal combined punched and reticulated upright stationary scourer and bolt B^1, B^3, and revolving cylindrical scourer and blower C, constructed, arranged and operated in the manner and for the purpose herein fully set forth, by which the fine flour that usually adheres to the bran, after being subjected to the first bolting operation, is now completely separated from the bran and collected in the annular space between the cylindrical bolt and cylindrical case, from whence it descends through the segmental openings in the horizontal base, upon which the said bolt and case rest, into conducting spouts, as aforesaid, whilst the bran is blown from the interior of the bolt through a spout leading through the external case, as aforesaid, in the meshes of the bolting cloth, being kept open by the pressure of air produced inside the combined cylindrical scourer and bolt, by the manner in which the oblique and radial and parallel wings are arranged on the revolving, scouring and blowing cylinder, as above set forth.

ISSACHAR FROST.
JAMES MONROE.

No. 6149.—*Improvement in Suspending Telegraph Wires.*

Having thus fully described our improvement and its modification, what we claim therein as new and for which we desire to secure letters patent, is suspending telegraphic wires across rivers by means of a stretched gum elastic band or tube, substantially in the manner and for the purpose set forth.

ELIJAH PRATT.
RAYMOND GRAVEREND.

No. 6150.—*Improvements in Brakes for Cars.*

What we claim as our invention is the stationary support plate, (composed of one plate or two plates E F,) the hinged flap G, and the confining bolts I K, (or other mechanical equivalents,) in combination together and as applied to the brake lever, and made to sustain the rubbing piece of wood D, substantially in the manner and for the purpose as herein before specified.

WILLIAM STINEHART.
JOHN TAGGART.

No. 6151.—*Improvement in Horse Rakes.*

What I claim as my invention and desire to secure by letters patent, is—so making horse rakes, by hanging the head or heads on one common rod or pivot, 2, as to allow each tooth to have a separate and inde-

endent movement, to enable the rake to pass over small as well as large bstructions, without disturbing the action of any of the contiguous teeth eyond the obstructing body. CALVIN DELANO.

No. 6152.— *Machine for trimming, smoothing, and folding Cotton Cloth.*

We lay no claim to the mere use of a revolving brush, but that which e do claim is the afore described new organization of horizontal and vertical ylindrical brushes and a set of draw rollers, as arranged, combined and perating together, substantially in manner and for the purpose as above esignated.

We also claim the revolving cylindrical brushes, (either with or without ie vertical brushes,) the set or system of draw rollers, and the folder or lding apparatus, in combination with one another, and as arranged and perating together, substantially in manner and for the purpose as herein efore explained. JOHN HIGGINS.
HIRAM H. HIGGINS.

No. 6153.— *Improvement in Looms for weaving Brussels Carpets, &c.*

Having fully described my improvement, what I claim as new and desire o secure by letters patent, is the toothed guides *i' i' i'*, employed in the manner and for the purpose above set forth, or in any other way which shall ccomplish the same end by analogous means.

I also claim the combination of the toothed guides, *i' i' i'*, with the wire-ox, or trough, *n*.

ERASTUS B. BIGELOW.

No. 615'.— *Punching Machine, with a combination of Adjustable Gauges.*

Having thus fully described my improved punching machine, what I claim herein as my invention and desire to secure by letters patent, is the combination of the graduated scale rods T T, and adjustable gauges U U, with the oveable gauges *p p*, and also the combination of the said graduated scale rods nd adjustable and moveable gauges, with the series of dies and punches, ubstantially in the manner and for the purpose herein set forth; not intending by these claims to limit myself to the exact form, proportion and arrangement of parts as herein represented and described, but to vary the same as I ay deem expedient, whilst I attain the same end by means substantially the ame. RICHARD S. TILDEN.

No. 6155. — *Improvement in Fire Escapes.*

What we claim as our invention and desire to secure by letters patent, is e manner of bringing the upright or vertical jointed bars (*b*,) of the frame ork herein described, into their erect position by means of the tumbling shaft ,) slot (*l*,) pin (*s*,) arm (*t*,) and flap (*f*,) when acted upon by the horizontal ames which are moved towards each other by a right and left hand screw S,) or other equivalent machinery for the purposes herein set forth.

We also claim the manner of bringing into their position on the notched volving block (G,) and of sustaining thereby, the vertical jointed bars (*b*,) s likewise that of removing the feet of the uprights from said blocks when ie frame is to be lowered, in the manner and for the purposes substantially as erein set forth. GEORGE. A. W. HUTTMANN.
GEORGE KOCH KORNELIO, Jr.

No. 6156. — *Improvement in Stoves for heating Apartments.*

What we claim as our invention and desire to secure by letters patent is,—

First. Admitting atmospheric air to the throat which forms the communication between the chamber for the combustion of the fuel, and the drum that the inflammable gases evolved from the combustion of the fuel in the fire chamber, may be mingled therewith in passing through the said throat, and be thereby effectually inflamed, and pass in an inflamed and inflaming state into the drum as described.

Second. We claim making the lower aperture of the throat that forms the communication between the fire chamber and drum, larger than the upper aperture thereof, substantially as described, that the inflammable gases and atmospheric air may be the better commingled in their passage through the throat, and thereby insure a more perfect combustion as described.

And finally, we claim making the said throat substantially as above described, with an enlargement between the upper and lower apertures thereof, that the gases that enter the said throat may have room to mingle with the supply of atmospheric air before they pass up and out of the smaller aperture above into the drum, as described.

JAMES SHIELDS.
JAMES COLE.

No. 6157. — *Improvement in the delivery and take-up motion of Looms.*

What I claim as my invention, is the combination of a set of two or more feed rollers and mechanism for operating them as described, with the yarn beam and take-up motion or mechanism of the loom; the whole being arranged and made to operate together essentially, as specified, the said feed rollers serving not only to firmly hold the warps under the beating up action of the reed, but to deliver them out at the rate required.

AMOS H. BOYD.

No. 6158. — *Improvement in Cotton Presses.*

Having thus described the construction and operation of my improved cotton press, what I claim therein as new, and desire to secure by letters patent, is the combination of the moveable end board *b*, its guides *i*, and supporting wedges *c*, with the moving packing box G, and stationary platen F, substantially in the manner and for the purposes herein set forth.

I likewise claim constructing the press box with the upper part of its sides and ends slightly inclined outwards, in the manner and for the purpose herein set forth.

THOMAS ASHCRAFT.

No. 6159. — *Improvements in the let-off motion of Looms.*

What I claim as my invention, is the combination composed of the gear *g*, screw *f*, shaft *z*, ratchet wheel *d'*, pawl *e*, lever Y, bar X, a bent lever composed of the arm V, shaft W, and arm *i*, or otherwise properly made, roller *k*, one or more cams *m*, *n*, the spring *c'*, the slide plate Q, and arm P, and weight W, as applied to the warp beam or roller, and made to operate together substantially as above specified.

And I also claim in combination with the above described mechanism for operating the warp roller, the stop motion or mechanism applied to the same, and the spring stop lever H, of the loom, the said stop motion consisting of the shaft *t*, and its arms *u*, *v*, rod *y*, notched lever *o*, and its spring *r*, the whole being constructed and made to operate substantially as above explained.

JEREMIAH MYERS.

No. 6160.—*Improved Spike Machine.*

What I claim as my invention and desire to secure by letters patent, is the combination of the dies T Y V W U R L, gauge G, holder B', and cutter C^5, arranged and operating substantially as above described, for making wrought spikes from a spike rod in a cold or heated state, the spike rod being flattened at one end, and the spike gauged, pointed, headed, and discharged at every revolution of the cam shaft B, as herein fully set forth; and this I claim, whether the several parts be arranged precisely in the manner above described, or in any other mode or manner, which may be substantially the same, and by which analogous results shall be produced.

MARCUS MAXIM.

No. 6161.—*Machine for cutting teeth of bevelled Gear.*

What I claim as my invention and desire to secure by letters patent is,—

First. The method of cutting the cogs of bevelled wheels by means of a reciprocating cutter that moves in or on a slide (or slides) that vibrates on an axis that coincides, or nearly so, with the apex of a cone representing the bevel of the wheel to be cut, substantially as herein described, by which vibration the depth of cut is determined; and this I claim, irrespective of the adjustment of the axis of vibration, as described.

Secondly. I claim the guide bar (or its equivalent) on which the cutter carriage runs, and having its axis of vibration for the depth of cut, as above described, when combined with a secondary frame jointed to the main frame at some point outside the circumference of the wheel to be cut, that the machinery may be adapted to the cutting of cogs on various bevels, substantially as described.

Thirdly. I claim, in combination with the guide bar, having an universal joint, or the equivalent thereof, and operated substantially as described, in combination with the guide plate, to guide the cutter and determine the form of the face of the cogs, as described.

And, lastly. I claim making that part of the guide bar which rests against the guide plate, to determine the form of the face of the cogs, separate from and moveable on the guide bar, and properly bevelled to relieve and clear the cutter for its back movement, substantially as described.

GEORGE H. CORLISS.

No. 6162.—*Improvement in Cut-off and working the Valves of Steam Engines.*

What I claim as my invention and desire to secure by letters patent, is—

First. The method, substantially as described, of operating the slide valves of steam engines, by connecting the valves that govern the ports at opposite ends of the cylinder with separate arms of the rock shaft, or the mechanical equivalents thereof, so that from the motion thereof the valve that keeps its port or ports closed shall move over a less space, while its port (or ports) is closed, than the one that is opening or closing its port or ports, and *vice versa*, while at the same time the two arms by which they are operated have the same range of motion, as described, whereby I am enabled to save much of the power heretofore required to work the slide valves of steam engines, and by which also I am enabled to give a greater range of motion to the valves at the periods of opening and closing the ports to facilitate the induction and eduction of steam, as specified.

And, lastly. I claim the method of regulating the motion of steam engines, by means of the centrifugal regulator, by combining the said regulator with the catches that liberate the steam valves, by means of moveable cams or stops, substantially as described.

GEORGE H. CORLISS.

No. 6163.—*Improvement in Drying Grain.*

What I claim therefore as my invention and desire to secure by letters patent, is the method of drying grain in an open stationary pan, having the fire and draft below it, with the rake above for stirring the grain and causing it to pass from the feeder to the delivery, substantially as described, whereby the moisture in the grain is more readily evaporated and liberated, and the apparatus constructed at less cost and with less liability to derangement than by any other plan before known, when this is combined with the feeder heated by a hot air chamber, substantially as described, whereby the grain is gradually heated in the feeder to draw out the moisture before it is exposed to a higher temperature in the pan to be evaporated, as described.

HENRY QUINN.

No. 6164.—*Improved Tubular two part Rail.*

I do not claim a compound two part rail, with alternating cross joints, but what I do claim and desire to secure by letters patent, is the forming of each part of a two part compound break-joint rail, as above described, so that when bolted together with a vertical joint they form a tube; and I also claim, in combination with said rail, a core of iron inserted at each semi-cross joint in the hollow of such a rail, with the view of obtaining equal strength at those points with any other part, and of holding each part in its place vertically at the cross joints.

I claim the stanchion to be bolted or nailed to the side of the sleeper for the support of the rail, constructed substantially as herein described.

JOHN ELGAR.

No. 6165.—*Improved Door Lock, by a combined Key and Gauge—also a Thief Detector.*

What I claim as my invention and desire to secure by letters patent, is the thief detecting slide, in combination with the tumblers and the protuberance, and the springs and levers by which it is operated, and the key gauge or register, in combination with a key having sliding bitts, constructed substantially in the manner used and for the purposes herein described.

FRANCIS CHARLES GOFFIN.

No. 6166.—*Improvement in Rope Machinery.*

What I claim as my invention and improvement on my patented machinery for making cordage, is—

First. The manner of producing and diminishing the friction on the bobbins, so as to keep up a uniform strain on the strands as they are drawn off, also to prevent kinking and too fast unwinding, as hereinbefore described and represented, or other mode substantially the same.

Second. I likewise claim the employment of the sliding toothed ring and endless chain, in combination with the toothed pulley *y z*, and perforated wheel, friction bars, spring and screw, for graduating the friction on the

toothed band, to cause the reel to wind up the rope as fast as delivered from the expansive and contractile pulleys, as above described.

WILLIAM JOSLIN.

No. 6167.—*Improvement in Cultivators.*

What I claim as my invention and desire to secure by letters patent, is connecting the teeth of cultivators to the frames thereof, by attaching them to blocks adapted to slide in the frame, and provided with screws for regulating their position relatively to one another, and to the draft beam, substantially as described;—and in combination with the foregoing,

I also claim as my invention, connecting the teeth by means of a hinge or other turning joint, and provided with the jointed screw brace, the said joints and screw braces being attached to the sliding blocks to which the teeth are attached, as described.

JEREMIAH WARNER.

No. 6168.—*Improved Horizontal Spark Arrester.*

Having thus fully described my improved spark arrester and its application, what I claim therein as new and for which I desire to secure letters patent, is a cap or horizontal pipe, with perforated top, expanded, and connecting with the fire box, substantially in the manner and for the purpose set forth.

T. WILLIS PRATT.

No. 6169.—*Improvement in Double Scale Balances.*

What, therefore, I claim as my invention, is the graduated scale E, and sliding or moveable weight F, thereof, in combination with the balance beam, (having arms of equal lengths,) and its two scale pans or platforms for sustaining weights, the whole being constructed and made to operate, substantially in manner and for the purpose as herein above specified.

THADDEUS FAIRBANKS.

No. 6170.—*Improvement in Apparatus for operating Shuttle Boxes of Looms.*

What I claim as my invention and desire to secure by letters patent, is the combination of the index wheel (A,) having moveable pins of different lengths with the shoe (B,) having projections adapted to the pins for the purpose of raising and falling the shuttle boxes, the whole being constructed substantially as above described.

ROBERT BURNS GOODYER.

No. 6171.—*Improved Combined Railroad Bar.*

I do not claim as of my invention the use of mere clamp plates and screw bolts for the union of the sections of rails or bars of railroads. I am also aware that rails have been made in two or more parts divided by a longitudinal plane or planes; but when so made the upper part constituting a cap is made separate from and attached to the base, and I do not therefore simply claim making rails in two parts when the top part depends alone on the bolts to keep it down; but what I do claim as of my invention and desire to secure by letters patent, is making such rails in two parts divided by a longitudinal and vertical plane when brought together and united by breaking joints, and secured by screw bolts, keys, or their equivalents, so that the junctions of the sections of one part shall be in the middle or near the middle of the sections of the other part, substantially as described.

And I also claim making a recess or groove at the junction of the two parts of the rail at the top, substantially as described, that the iron when beaten down by the action of the wheels of railroad trains may spread therein without having a tendency to force apart the two halves and strain the securing bolts or keys, as described.

ALFRED B. SEYMOUR.

No. 6172.—*Improvement in regulating Forebays.*

What I claim as my invention and desire to secure by letters patent, is the method of regulating the supply of water from one and the same forebay, to different water wheels or other movers of machinery driven by water, by means of a partition or partitions over which water not required for the steady action of one wheel, or series of wheels, may pass to one or more other wheels which do not require constant and invariable supplies, in the manner and for the purposes herein set forth.

I also claim the use of the above manner of regulating the water of a forebay by partitions, in combination with one or more swinging gates attached to said partitions, so adjustable as to regulate, change or reverse the course of the currents of water, and also in combination with the regulating waste gates, herein described, acting in the manner and for the purposes herein set forth.

HENRY MALLOW.

No. 6173.—*Improvement in Spring Shanks for Boots and Shoes.*

I do *not* claim the invention of a metallic shank for boots or shoes, but *what I claim* as my invention and desire to secure by letters patent, is the position of the slot *f*, and sliding part of the spring shank within the boot or shoe heel, for the purpose of being protected from injury, in the manner and for the purpose described.

JOHN McGINLEY.

No. 6174.—*Improvement in Balances for weighing.*

What I claim as my invention, is the afore described improvement or combination as applied to a scale beam, and composed of the following elements, or their mechanical equivalents, viz: 1st, the suspended platform D; 2d, the series of one, two, or more weights Q R S; 3d, a lowering and lifting apparatus, the same consisting of the cone K, slide bar P, and catch T, as specified, the whole being combined and made to operate together in the manner and for the purpose as above explained. And in combination with said lifting and lowering apparatus, I claim the scale of figures on the slide bar P, and the hole *m*, made through the post H, or their equivalents, the same being for the purpose described.

ROBERT EASTMAN.

No. 6175.—*Improvement in Cotton Presses.*

I do not claim the frame steam cylinder, cogged piston rod, nor cogged eccentric levers for compressing bales of cotton by steam power; but what I do claim, is—

First. The combination and arrangement of the circular revolving platform A, and radial presses G H I, for conveying uncompressed bales of cotton or other substances *to* the steam cylinder, to be compressed simultaneously with the operation of conveying compressed bales *from* the steam cylinder to be tied, by which all the hands attending the various parts of the machine are

kept constantly employed during the operation of the steam engine, whether the revolving circular platform be made, arranged and operated in the manner herein described, or other mode which may be substantially the same.

Second. I claim the combination and arrangement of the jointed arms T^1 T^2 T^3 T^4, levers W W, slotted arms *b*, and triangular plates *d*, as connected with the follower I, and head block G, operating in the manner herein set forth, for preventing the descent of the follower I, when detached from the lifting hooks R, of the steam engine, before the ropes are tied.

Third. I claim the mode of conveying the ropes for tying the bales, through the grooves of the head and tail block by means of the conveyors M, during the operation of compressing a bale simultaneously with the ascent of the follower I; and then returning the conveyors M, to their original positions simultaneously with the descent of the said follower I, by means of the combination of the conveyors M, rollers K K′, and cords attached to the same, arranged and operating in the manner above set forth.

Fourth. I claim the manner of employing the four upright pillars H, with shoulders in combination with the head block G, follower I, and circular revolving platform A; said pillars being arranged and operating in the manner described for the purpose of supporting the head block G, in such manner that it can accommodate itself to the position of the pendant head block *f*, during the operation of compressing, without deranging or straining the platform A, said pillars playing loosely in boxes *r*, let into the platform on which the shoulders rest whilst adjusting the bale for compressing.

WM. J. JOHNSON.

No. 6176.—*Improvements in Rope Machinery.*

As to the above described machine, I make no claim to the one general principle involved in the combination of a drawing and stretching apparatus, with reels revolving on the planetary system, for the purpose of making cordage or ropes, inasmuch as a machine involving that general principle has been in use in England for several years; nor do I claim to have invented the tubes, adjusting plates, or press-blocks, individually considered, but confine myself to the following specific claims, as being new and useful improvements upon the English rope machine, viz:

What I claim as my invention and desire to secure by letters patent are,—

First. I claim the placing each reel at such an inclination towards the point of "laying" or combination, as that its whole axis shall be in a direct line with its strand after it leaves the tube, and is beginning to be combined, and so that the tubes of the respective reels shall be almost in contact at their upper ends, just immediately below the nipper blocks; the tube on each reel being a part of and a direct continuation of the axis of its respective reel.

Second. I claim the placing of the reels also at a suitable angle of inclination from the right or left of the rope, so that the strand as drawn out of each tube, has a direction towards the outside of the rope, viz: should a right line be drawn lengthwise through the centre or axis of either reel, and continued, it would be in the centre of its strand also onward to that side of the rope upon which it is being laid, and from which the tube recedes when carried round upon the vertical shaft.

Third. I claim the use of a concave stationary driving wheel, connecting with the reels by pinions above the bobbins, for giving the necessary counter motion to each reel, as they are carried round by the vertical or main shaft.

Fourth. I claim the two thumb screws and elastic levers, substantially as herein described, in combination with the tubes arranged as above described, for giving the nipper blocks a more steady and regular pressure or grasp upon the rope.

Fifth. I claim the application of the adjusting plate between the press block and tube, the same being secured by means of the mortise or opening through the shaft, and the grooves therein, within which it is made to slide substantially as herein described. BENJ. MORISON.

No. 6177. — *Improvement in Cooking Stoves.*

What I do claim as my invention, and desire to secure by letters patent, is extending the hot air chamber under the fire grate when the top plate thereof is so inclined or curved as to discharge the ashes that fall thereon from the grate, that the said air chamber may be heated by a radiation from the fire on the grate above, substantially as described.

I also claim making the hot air chamber in two compartments, by a partition perforated at or near the middle of its length, in combination with the perforations in the back plate of the back chamber, or front of the oven, and near the ends thereof, substantially as described, that the air which enters the chamber through holes in the sides of the stove may be forced to circulate through the hot air chamber to be heated, before it enters the oven near the sides thereof, as described.

And finally, I claim in combination with the method herein described of heating the top of the hot air chamber, the extension of the bottom flues of the stove, that the products of combustion in passing around to enter the return flue, may pass under the bottom plate of the hot air chamber, and thus aid in heating the air therein, as described.

GEO. E. WARING.

No. 6178. — *Improvement in Curry Combs.*

What I claim as my invention, is the mode of making curry combs by constructing their body and teeth out of one solid sheet, or piece of metal, by so cutting and bending the said sheet or piece of metal, as set forth in the above specification, that without any material waste, and without the combining and riveting, or fastening together separate and detached portions of the structure, I do make a complete body and teeth for the comb.

I also claim the entire form and combination of the parts to form such a comb as is described and illustrated in and by the said specification and drawings. ANDREW HOTCHKISS.

No. 6179. — *Improvement in Ploughs.*

What I claim as my invention and desire to secure by letters patent, is the constructing the share and point of my improved plough of a diamond shaped flat plate of metal (B,) placed under the mould board (C,) and combined therewith, and with the flange 3, and standard 1, (of the casting A,) in such a manner that the share-plate (B,) can be moved forward to a proper position, as its operating point or share-edge wears away by use, without producing the slightest change in the form or position of the winding concave face of the mould board, substantially as represented and described herein, and for the purpose set forth. WILLIAM T. SPROUSE.

No. 6180. — *Improved Furnace for smelting Zinc.*

I do not claim to be the inventor of retorts or muffles, pots or cylinders, or chambers in furnaces, to receive them for distilling or volatilizing zinc, or any of the modes now in use, where the heat is generated in the chamber with the retorts or muffles, or generated in a fire place, and pass into a chamber containing pots, cylinders, muffles or retorts, heating the sides of the furnace and flues and walls of the chamber, which serve only to confine the heat round the retorts; these heated walls allow much caloric to pass away without coming in contact with the ore, and require from ten to twenty tons of coal to produce a ton of metallic zinc.

What I do claim as my invention, and desire to secure by letters patent, is a combination or double retort or furnace, generating the heat within the vessel or chamber containing the ore to be heated, surrounding the fire chamber or place of combustion with the ore, so that the caloric going off in any direction from the fire(except down through the grates) must pass through the ore. With this arrangement, merchantable metallic zinc is obtained from the ore, in the proportion of one ton of zinc by four and one fourth tons of coal.

SETH BOYDEN.

No. 6181.—*Improvement in Curry Combs.*

Having thus fully described my improvement, what I claim as new and desire to secure by letters patent, is the shank constructed with the fastening hole therein, made without drilling or welding, and combined with the comb as herein above described, so as to act as guards to the ends thereof.

WM. BEACH.

No. 6182.—*Improvement in Smoke Consuming Apparatus.*

What I claim as my invention and for which I now claim letters patent, is:

First. Combining with the blowing wheel which forces the blast into the furnace, and which receives a portion of the products of combustion from the furnace, an auxiliary blower or blowers to insure the requisite supply of atmospheric air to the main blowing wheel, substantially as described.

Second. I claim connecting and combining the damper that governs the blast pipe with the dampers that govern the apertures through which the products of combustion enter the fan blower, for the purpose and in the manner substantially as herein described.

And lastly, I claim making the case that contains the gravel, or other impeding medium of a double cylinder or prism of wire gauze, or the equivalent thereof, when this is so combined with the chimney as to prevent the escape of the products of combustion, except through the interstices of the said impeding medium, substantially as described.

F. P. DIMPFEL.

No. 6183.—*Improvement in Grain Gatherers.*

I do not claim to have invented any of the parts herein described and shown, irrespective of the uses to which I have herein put them; but what I do claim as new and of my own invention and desire to secure by letters patent of the United States, is the application and use of the foot lever E, acting through the hinges *e e*, to give a motion to the fingers or teeth *b b*, indepen-

dent of the motion of the handles *f f*, for the purpose of throwing the grain into a position over the handles *f f*, and arms *d d*, whereon it may be readily bound into bundles, as described. WM. HERRIES.

No. 6184.—*Improved Door Lock.*

What I claim as my invention and desire to secure by letters patent, is—

First. The talons as constructed on the end of the lever 2, herein described, by means of which and the connecting tumbler 3, when acted upon by the key, the fallers are prevented from acting upon the bolt.

Second. The interposition of a metallic plate over the keyhole in the manner represented at fig. 2, in combination with the lever 5, the spring *z*, upon it and the notches in the rim of the lock.

Third. The pin *l*, of the night latch constructed so as to revolve in its socket, all as herein set forth. S. M. PYE.

No. 6185.—*Improvement in Planing Machines.*

Having thus fully described the parts and combinations of parts of our invention, with the modes in which we contemplate applying the same—

What we claim as our invention and desire to secure by letters patent, is the combination, arrangement and construction of the double cams P, the eccentric clamps M and M, and the rockers N and N, for the purpose of producing an uniform, continuous and parallel feed motion without rollers, rack and pinions, endless chains, or any common device, by which means we produce a parallel feed motion, without the expense and friction of ways or slides, whether applied to planing machines, or for any other purpose, substantially as described and shown.

Also, the construction of the fence D, or any analogous device against which to spring or curve a board to be planed, in combination with screw clamps, or gauges, with proper contrivances I and J, or other means adapted to the curve on the fence D, extending each way from the centre of the curve and disk, embracing each line of the fence as far as may be necessary, for the purpose of receiving the board or plank, by clamping or otherwise acting upon the edges, while it is on the front line of the fence, holding and directing it around the curve, springing and presenting each portion of the board, successively to the action of the finishers on the disk, on a curve, and also preventing the finishing portion of the surface from coming in contact with the knives, on the back part of the disk as it passes out of the machine on the rear line of the fence, substantially as described and shown.

Also, the combination of the armed fence H, and gauges I and J, or any other device for springing and presenting a board or plank on a curve to the action of planes or finishers on a disk, with the disk E, and long or broad finishers F, to extend across the board the entire width, and at right angles with the shaft *c*, for the purpose of planing boards and plank when presented on a curve, thereby finishing them while cutting with the grain, and leaving no circular marks or scores across the board or plank, in the manner herein before substantially described and shown.

The effects of these improvements are the production of a new parallel feed motion without the friction and expense of ways or slides; and also a new method or principle of presenting a board or plank to the action of the knives or finishers revolving on a disk on a curve, by which means the finished surface is made, while the finishers are cutting with the grain of the wood, thus

converting the disk or Bramah wheel, which has hitherto been comparatively of little worth, into a most useful and valuable machine. The tendency of the planing operation with the disk is to move the board edgewise in the same plane in which the knives revolve, in contradistinction to the Woodworth cylinder, which tends to lift the boards directly up from its bed as it cuts up and out from the reduced or planed, to the unplaned surface, as declared in said Woodworth patent.

DANIEL BARNUM.
THOS. J. WELLS.

No. 6186.—*Improvement in Looms for weaving Brussels Carpeting, &c.*

Having fully described my improvements in the foregoing specification, what I claim as new and desire to secure by letters patent, is—

First. The moving the trough or grooved bar *f'*, forwards towards the face of the cloth, when between the warps, for clearing the shed, in the manner above described.

Secondly. I claim the said trough or grooved bar *f'*, in combination with the lathe of the loom, whether said lathe be constructed with two pairs of swords, as above described, or in any other way which shall give to the race beam a counter motion, or move the said trough or grooved bar *f'* forward between the warps, for the purpose and in the manner above set forth, or in any other way which shall accomplish the same end by substantially the same means.

E. B. BIGELOW.

No. 6187.—*Improved Spiral Spark Arrester.*

Having thus fully described my improved spark arrester, what I claim as my invention and desire to secure by letters patent, is the combination of the chamber containing the wings *c'*, and wings *h*, with the openings *x*, and volutes *e*, in the manner and for the purpose described; by means of which I am enabled to make sufficient eddies and throw down the sparks more perfectly than by any other arrangement with which I am acquainted.

ANDREW M'CLEARY.

No. 6188.—*Improvements in apparatus for Dressing Cloth.*

What we claim as our invention and desire to secure by letters patent, is the combination of the rotary brushes, shears, steaming apparatus, polishing velvet roller, and other parts, as herein described, with the polished convex, metallic rubbers, whereby all parts of the process of finishing a piece of cloth, after it leaves the fulling mill, are simultaneously and continuously performed.

JOHN JOHNSTON.
JOHN D. SNYDER.

No. 6189.—*Improvement in Cotton Batting.*

Be it distinctly known, that we do not claim as our invention the mode of operating a series of carding machines, the one before the other, to make batting, as shown by J. Essex's drawings, nor any part of the above described machine. What we claim as our invention and discovery, is the method of laying on and covering the entire upper and lower surfaces of cotton batting that has been merely well picked and spread in a lapper, with a thin sheet or layer of carded cotton, for the purpose of making it smooth and strong,

thereby fitting it for being packed and pressed and used for batting purposes, such as beds, mattrasses, &c.

H. B. LAWTON.
HIRAM T. LAWTON.

No. 6190.— *Improvement in apparatus for Raising and Tilting Water Buckets.*

What we claim as our invention and desire to secure by letters patent, is the combination of the vibrating arms *i*, *i*, with the cog wheels *f*, *f*, of the crank shaft, in such a manner that by the lengthwise movement of the crank shaft, one of the arms (*i*,) is thrown into, and retained in a horizontal position, for bearing against the rope of the ascending bucket to steady the same; and also in combination with the strap *s*, by which the bucket is connected with its rope, serving to turn and guide the bucket so that it will be caught and capsized by the tilting bar *j*, substantially as herein set forth.

HARVEY W. SABIN,
LUTHER B. BENTON.

No. 6191.—*Improvement in apparatus for Raising Water.*

What I claim and desire to secure by letters patent, is raising water by centrifugal force, produced by a combination of inclined planes and fans attached to a shaft, as herein described, using any combination of inclined planes or fans to produce the intended effect.

WILLIAM T. BARNES.

No. 6192.— *Improvement in apparatus for drawing Water from Wells.*

What I claim as my invention and desire to secure by letters patent, is the mounting the driving pinion K, and the auxiliary reversing pinion L, which is geared thereto in bearings M, N, rising from the vibrating tumbler R, which tumbler is combined with and operated upon by the inclined planes W and V, rising from the sliding bar T, (through the medium of a lever,) substantially in the manner and for the purpose herein set forth; not intending by this claim to limit myself to the exact proportion and arrangement of parts, as herein described and represented, but to vary them as I may deem expedient, whilst I attain the same end by means substantially the same.

JEHIAL T. FARRAND.

No. 6193.— *Improvement in Tide Water Wheels.*

What I claim as my invention and desire to secure by letters patent, is the arrangement of the shaft E, in an inclined position, so that while the buckets of the water wheel dip in the water on one side of the wheel those of the other side become elevated above the surface, in combination with the water wheel and with the horizontal revolving platform, whereby the position of the water wheel is occasionally changed, without disconnecting the gear wheel F, from the wheel or pinion N, as herein fully set forth and described.

FREEMAN F. MYRICK.

No. 6194.— *Improvement in Steel Yards for Weighing.*

The combination we claim and consider as our invention consists as follows:—First. The steel yard and scale pan, or any equivalent or equivalents therefor. Second. The auxiliary scale on the short arm of the steel yard. Third. The moveable bar A, or its equivalent. Fourth. The balancing lever

and stirrup of the scale pan. The whole being made to operate together by means of weights, substantially in manner and for the purpose as specified.

TILLY FLINT.
WARREN FLINT.

No. 6195.—*Improvement in Planing Machines.*

Having thus fully described the parts used in these combinations, and shown the modes contemplated for using them, what I claim as my invention and which I desire to secure by letters patent, is the application to the face disk C, of one or more long or broad plane irons or finishers, embracing the whole width of the board, the inner ends or edges of which, being slightly elevated, and which in their rotations form or generate a slight cone *a* 8, in combination with the jacking tools *a* 7, or of gauges placed upon the periphery for the purpose of producing a two-fold action, that is, the slight conical cut of the finishers *a* 8, and the perfect disk operation of the jacking tools *a* 7; thus uniting and claiming the action of the cone and the disk in one and the same planing wheel; I thus produce the effect of the Bramah gauges, in chipping or hewing away the roughest part, the jacking tools revolving in the perfect plane of the disk, and also the effect of the cone by the slight elevation of the finishers *a* 8, on the end near the shaft 6, which effect is to finish the surface while the finishers *a* 8, are cutting with the grain of the wood, the shaft 6, being slightly inclined to correspond with the elevation of the knives or finishers *a* 8; the finishing is thus done with the grain, and leaving no circular mark across the board, and in contradistinction to the finishing operation, as was performed by Bramah, his finishers cutting in circular scores across, from one edge to the other of the board, leaving the surface indented with them, and unfit for use, while I produce a perfectly level and smooth surface, substantially as described and shown.

THOS. J. WELLS.

No. 6196.—*Machine for making Percussion Caps.*

I do not claim as my invention, punches and dies for making percussion caps, as these have been so employed in various ways; but what I do claim as my invention, and desire to secure by letters patent, is the combination and arrangement of the mechanism above described, for producing the combined operations herein fully set forth, of feeding the metallic ribbon to the star die U′, punching the blank from the ribbon, transferring the blank to the forming die V, by the transferring apparatus T T′ T″ T‴, punching the blank into the forming die V, and forming it into a cap, and discharging the same from the die by the elevator *e*, and kicking the cap, in a finished state, from the die bed, by the driver *y*; all of said operations being performed successively at every revolution of the crank and cam arbor C, to which the propelling power is applied, substantially as above described.

Secondly. I also claim the transferring apparatus, constructed substantially as described in combination with the punches.

R. M. BOUTON.

No. 6197.—*Improvements in Carding Machines.*

First. Having thus explained the nature of my invention, its mode of construction and operation, I do not claim the lap cylinder (*k*,) nor the licker-in

(*a*,) nor the feed rollers (*n n*,) but I claim the weighted roller (*m*,) in combination with the feed rollers and the lap cylinder, for the purpose of drawing in cotton, and feeding it to the licker-in in a thinner sheet than is done by carding machines at present in use.

Second. I do not claim a licker-in, nor the first main cylinder as such, nor the common action of such cylinders as they may have been heretofore well known, in whatever relative position they may have been placed; but I do claim the aperture and chamber in the casing at (*t*,) where the casing projects in near to where the main cylinder card at its lowest surface takes the staple from the top or upper surface of the licker-in card, near to such aperture and chamber as described (and also provided in the casing;) and I do claim them also in combination with the peculiar placing of such main cylinder (*b*,) directly over the licker-in (*a*,) so as to bring their place of nearest proximity and action exactly or nearly over the centre of the licker-in, and as near to such aperture and chamber as it may safely be placed, in order to discharge such dirt and silicious impurities as may be disengaged by such action, and throwing it through such aperture by the combined motion of both cylinders, without allowing it to fall either into the cards again, or on to the lap or mat of cotton entering them.

Third. I do not claim the using of two doffers to one main cylinder, or of double doffers, so called, as such have been used in different methods, and for different purposes, having action with the main cylinder; but I do claim the arrrangement and action of a reducing doffer, as my own invention, the same having no action with the main cylinder, but with the doffer, whereby I collect the fibre from the common doffer, though sparsely scattered thereon, into a thicker sheet or mat more suitable for a proper delivery by the comb or other apparatus for stripping or clearing the same; and I claim the same, whether operated by using two such reducing doffers in combination as cylinders (*g*,) and (*h*,) fig. 1st, or by using one only, as cylinder (*q*,) in fig. 2, or in any other way that is substantially the same in principle and effect, in order to collect the staple from the common doffer into a thicker mat, to be taken off by a comb or other stripper. I am enabled by the action of such reducing doffer to run the common doffer at a much greater speed than is usual, thereby presenting a much larger amount of clean doffer and sheet to the surface of the main cylinder, whereby I keep the staple in greater sparsity than I otherwise could, without having it too sparse to be delivered in a perfect mat or sheet.

Fourth. I do not claim a card roller or top clearing cylinder, extending across a main cylinder, simply as such, I having understood that top flats have been constructed as well rotating as stationary; those revolving, doing so in a direction calculated to press the impurities by them disengaged from the main cylinder, under their lower surfaces, between them and the main cylinder, carrying it to a place to be stripped from off their rising surface; but what I do claim, is a card roller or top clearing cylinder (*i*,) moving the impurities, disengaged by its lower surface from the main cylinder on its edge in a direction contrary to the edge and action of the main cylinder, and calculated to take it out from the place of contact without pressing it between itself and the main cylinder, in combination with beater or stripper (J,) revolving in a manner to clear the same, and deposite the strippings as described.

THOMAS G. BOONE.

No. 6198.—*Improvement in Cooking Ranges.*

What I claim is the combination of the auxiliary heating chamber T, and secondary fire place and flue S′, with the main fire place specified; the said secondary fire place being made to receive its air from its side, and through the main fire place JOHN M. DEARBORN.

No. 6199.—*Improvement in Draining and Blanching Sugars*

What I claim as my invention and desire to secure by letters patent, is the method of bleaching and draining brown sugars on the plantation, ashere in set forth; that is to say, blanching the sugar by a solution of molasses and water, both being in the cold state, and the operation being performed in the hogshead destined for the transportation of the sugar to market, thereby increasing the value of the sugar without a corresponding increase of expense, as herein set forth and described. J. SPANGENBERG.

No. 6200.—*Improvement in Processes for Burnishing Metals.*

What I claim as my invention and desire to secure by letters patent, is the mode herein described, of preparing surfaces of cast or wrought iron, or other metals and stone, so that they may be gilded or silvered in the same manner as wood and burnished with equal facility, viz: by applying thereto the preparations of shellac and yellow ochre, (or other similar and suitable earthy or mineral substance,) herein set forth and described.

EDWARD SATTERLEE.

No. 6201.—*Improvement in Portable Hot Air Furnaces.*

Having thus described my improved portable furnace, I shall state my claim as follows:

What I claim as my invention and desire to have secured to me by letters patent, is the combination of four or more horizontal and parellel smoke flues or chambers, each connected with the one next above it *alternately* at the *front* and then at the rear of the furnace, and the top plate of each chamber having for the purpose an opening to establish the connection, as described above, with the two exterior diving cold air flues *q q*—*q q*, and the central hot air chamber *r r*, the whole being substantially as herein above set forth.

JOHN P. HAYES.

No. 6202.—*Bell Telegraph.*

What I claim as my invention and desire to secure by letters patent, is the combination of the turning tablets, with the wires, springs, and levers for turning them, arranged substantially in the manner and for the purpose herein described. HARVEY HOUGHTON.

No. 6203.—*Improvement in Magnetic Telegraphs.*

Having thus described the construction and action of my machine, what I claim as my invention and desire to secure by letters patent, is moving the paper on which telegraphic marks are made, into and out of contact with a stationary pen, by which means I avoid the danger of dispersing the ink, which happens when the pen is rapidly agitated, and also gain the advantage of supplying the ink while the telegraph is in action, to a pen wholly at rest, as herein set forth.

I also claim the operating the magnet which effects the movement of the paper directly through the main telegraphic circuit, thereby dispensing with the secondary or receiving magnet and local battery.

I also claim the arrangement herein described for conveying ink to the stationary pen of a marking magnetic telegraph, by means of an adjustable feeder regulated to correspond in its action with the rate of motion given to the strip of paper on which the telegraphic marks are to be made, in a manner substantially as herein set forth.

I also claim the horizontal adjustable supporting stand A, in combination with the stationary pen axis *a*, the paper carrier *o*, and its adjusting screw H, and with the vibrating lever B, when employed to adjust the direction of motion of the paper and allow the marks to be made along its central line, in the manner and for the purposes herein set forth; not intending in these claims to limit myself to the precise arrangements of parts herein described, but to vary the same at pleasure, while I attain the same ends by means substantially the same.

CALEB WINEGAR.

No. 6204.—*Improvement in Cotton Cultivators.*

What I claim as my invention and desire to secure by letters patent, is—

First. The grooved board fig. 4, fitted to the scraper and bolted to the beam for the purpose of protecting the plants from falling clods of earth; and

Second. The arrangement of teeth in one beam B, of the cultivator, and constructing them of different lengths for the purposes set forth.

SAMUEL W. AKIN.

No. 6205.—*Improvement in Air Heating Furnaces.*

What I claim is the manner in which I arrange the furnace, smoke pipe, and air heating spaces, as herein set forth, that is to say, I claim placing the furnace at or near the centre of the spiral flues and air spaces, the furnace being surrounded on all sides except the back and front, as herein described.

I also claim the manner of arranging the valve K, in combination with the three flues I, *i*, and L, for the purposes of heating and ventilation, as herein set forth.

OLIVER TIFFANY.

No. 6206.—*Self-adjusting Railroad Switch.*

I am aware that the switch has been changed by the action of the cars, and the apparatus connected with them in various ways; I therefore do not claim changing the switch by apparatus worked by the cars, as such, as my invention; but what I do claim as my invention and desire to secure by letters patent, is the combination of the triangle H, with the wheel G, the detent *j*, the lever O, and the bars *l* and *o*, when connected by the bars *d* and *d'*, and the triangle H, connected with the bars D and E, by the bar K, and the wheel G, connected with the switch B B, by the bar F, or other analogous device, (and the corresponding parts marked D' E', &c., when the train is passing in the opposite direction.) The whole constructed, arranged, combined, and operating substantially as herein described.

ERASTUS C. MATTHEWSON.

No. 6207.—*Improved Spring Snap Hook.*

Having thus described the construction and operation of my improved barbs and spring snap hook, I do not claim to have invented the hook, shown in

figures 1 and 2, as that is well known, but what I do claim as new and of my own invention and desire to secure by letters patent of the United States, is as follows:

I claim the sliding springs 3 and 4, figures 3, 4, 5 and 6, with points turning outwards, with or without barbs, in combination with the single spring 12, and hook 13, shewn in figures 7, 8, 9 and 10, or the double spring 18, 18, with hooks 19, 19, in figures 11, 12, 13 and 14, or with the barbed lance shewn in figures 17, 18, 19 and 20.

JOB JOHNSON.

No. 6208.—*Improvement in the manufacture of Paper Veneers.*

What we claim as our invention and desire to secure by letters patent, is the application and use of the type and ink, as herein described, for the purpose of manufacturing paper veneer, and making an application of it to the purposes herein designated.

CHARLES WALKER.
GEORGE WILLSON.

No. 6209.—*Adjustable Cut-off.*

Having thus described my method of operating the valves of steam engines, what I claim therein as of my invention and discovery and for which I solicit letters patent, is raising the valves by means of the tappets of a revolving shaft, acting against the adjustable sliding feet of horizontal vibrating levers which raise the valves, whereby the steam can be cut off at any point in the stroke of the piston that may be desired, and the points of cutting it off changed from time to time without stopping the engine. I desire it to be understood, that I do not limit myself to the precise arrangement of parts herein represented, but claim the right of varying the same to any extent that may be deemed advisable, while I accomplish the same results by essentially analogous means.

I likewise claim reversing the motion of the engine by means of the clutch coupling, arranged and operated substantially as herein set forth; and also by the same means throwing the chain which operates the valves out of gear, when it is required to work them by hand.

JULIUS KING.

No. 6210.—*Improved Sliding Wrench.*

Having thus described my improvements, I shall state my claims as follows:

What I claim as my invention, is a wrench in which the sliding jaw is moved by two segments of a cylinder connected with said jaw, as above set forth, and having screws on their upper ends engaging with the screw on the interior of the hollow cylindrical handle, the arrangement of the several parts being substantially as herein above set forth.

DEXTER H. CHAMBERLAIN.

No. 6211.—*Improvement in Planing Machines.*

Having thus fully described my improved planing machine, I wish it to be understood, that I do not claim merely the two revolving feeding platforms, they having before been used, but what I claim therein as new and for which I desire to secure letters *patent, is*—

First. The combination of endless platforms or bands, as described, above and below the plank, and geared together so as to be forced to move in one direction and with the same velocity, said top platform being held down upon the board by means of the links *n*, with a force varying with the resistance of the cutters, for the purpose of forcing the plank through under the stationary cutters, as above described, when used in combination with said stationary cutters.

Secondly. I claim the stationary cutters, in combination with the yielding bar mouth pieces, substantially in the manner and for the purpose set forth.

Thirdly. I claim the adjustable edge rollers, in combination with the tongueing and grooving cutters, or other stationary edging cutters, as above made known.

JOSEPH P. WOODBURY.

No. 6212.—*Improvement in Gas Burners.*

What I claim as my invention and desire to secure by letters patent, is, in the first place, the application to gas burners of a ring, band or tube of any kind, moveable or stationary, or made with the said burner out of the same piece, for the purpose of increasing the light by altering the shape, direction or force of the stream of gas escaping from a gas burner of any construction whatever.

I also claim, in the second place, and desire to secure in the same manner, the application of notches to the upper edge of the tube, for the purpose of giving shape or brilliancy to the flame, resulting from the combustion of gas from burners, to which a tube band or other similar body has been applied.

I also claim, in the third place, and desire to secure as aforesaid, the mode of regulating the flame of gas burners, having a band, tube, ring, or similar body, namely, by raising and lowering said tube, band, ring, or other similar body, by means of a nut and screw, (or slide,) or by any other known means of changing the relative position of the edge of the tube, and the nipple of any kind of gas burner, to which my invention may be applied.

DANIEL H. SOLLIDAY.

No. 6213.—*Improvement in hanging Carriage Bodies.*

What I claim as my invention and desire to secure by letters patent, is the above described arrangement of a cross or disk, attached by a pivot to the perch of a spring vehicle, combined with the inflexible rods or braces, attached to the body of the carriage, and so disposed on the extremities of the cross or periphery of the disk that the oblique action which they produce on one side shall counteract that which they produce on the other, in the manner and for the purposes herein set forth; and I claim the application of this, my invention, as well to railroad cars and trucks as to vehicles running on common roads.

ISRAEL JACKSON.

No. 6214.— *Improvement in Surgical apparatus for fractured or injured ankles.*

What I claim as my invention, and desire to secure by letters patent, is the mode of supporting the ankle when fractured or otherwise injured, at the same time allowing a flexible movement to the same, by means of the before describ-

ed combination of spring bars E G, and moveable stops F *f*, shank plate A, curved, jointed and oval bars, and pad or bandage, as described.

GEORGE W. YERGER.

No. 6215.— *Improvement in Springs for Carriages, &c.*

What I claim as my invention and desire to secure by letters patent, is the before described mode of making India rubber springs for carriages and other purposes, by which the several endless elastic belts are successively brought into action as the load is increased, by means of the combination of the concentric endless elastic belts, and concentric rows of pins, or their equivalents, the concentric segment rings being connected to the plates attached to the body and running gear of carriages, the several parts being constructed and arranged, substantially as above described.

DANIEL R. PRATT.

No. 6216. — *Improved machine for turning a Lock on sheet metal.*

I do not claim the bed piece, the tumbler, the folding slide or the lever, separately; but what I do claim as my invention, and desire to secure by letters patent, is the combination of the bed piece, the tumbler, the folding slide and lever, for the purpose of turning a lock on sheet iron or other metals, as herein described and set forth by these specifications.

JOHN WRIGHT.

No. 6217. — *Improved conical valve Tuyeres.*

Having thus fully described my improved forge tuyere, what I claim therein as new, and desire to secure by letters patent, is the giving the moveable valve *c*, the form of a cone, for the purpose of facilitating the discharge of the ashes and cinders into the air box and ash pit, and for protecting the valve from being injured by the fire, substantially as herein set forth.

ROBT. D. PORTER.

No. 6218. — *Improved Feeder and Nippers for Screw Cutting Machinery.*

What I claim as my invention and improvement, and desire to secure by letters patent, is first, the permanent vertical feeding tube or shaft, extending from the top of the frame down to a point near the grippers, in combination with the revolving tube (*c*,) and grippers (*d*,) whereby I am enabled to feed the blanks directly through the said tube on the grippers, without imparting rotary motion to them until they reach the jaws of the grippers, thereby ensuring perfect regularity in the feed, as described; secondly, I claim the peculiar construction of the grippers in respect to the double action of the jaws, whereby but one screw blank can enter, be held and discharged at a time, although a series of the said blanks may fill the entire length of the stationary feeding tube, the whole operating substantially as set forth herein.

WILLIAM VAN ANDEN.

No. 6219.— *Clarification of Cane Juices.*

What I claim as my invention and discovery, and desire to secure by letters patent is,—

First. The direct application of steam by injection to the sugar cane juice whilst in the vats, and before being transferred to the "*grand*" for the purpose of speedily heating, clarifying, defecating, purifying and freeing the juice of the feculent and other extraneous, injurious and impure matter, as herein fully set forth

J. SPANGENBERG.

No. 6221. — *Combined convex and concave Auger.*

What I claim as my invention, and desire to secure by letters patent, is forming the lower part of the plate from which an auger is to be formed, of a convex shape or of even thickness, when this is combined with the upper part of the plate formed of a concave shape, the whole plate being formed for the purpose of making therefrom a double tipped convex and concave auger.

NATHANIEL C. SANFORD.

No. 6222. — *Improvement in Cooking Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the oblique plate under the forward part of the bottom of the oven, when this is combined with the air chamber formed by the oblique plate and the forward part of the bottom oven plate of a cooking stove, as herein described.

WILLIAM E. BLEECKER.

No. 6223. — *Improvement in Piano Fortes.*

I do not limit myself to the peculiar mechanical detail herein set forth and described, for supporting, raising and depressing the weights, intending to use any of the well known mechanical apparatus fitted for that purpose.

I claim the application of weight or pressure upon the sounding board of the piano forte, either directly or upon the crooked bridge thereof, as the most convenient mode of applying the same for the purpose of producing a change in the tone of the instrument, thereby extending its musical capabilities.

JAMES A. GRAY.

No. 6224.—*Combination of adjustable Saddle and Winch.*

What I claim, therefore, as my invention and wish to secure by letters patent, is the combination of a winch with a moveable and adjustable saddle, connected so that the winch moves with the saddle, the whole being constructed, arranged and operating substantially as herein described.

A. G. POLHAMEUS.

No. 6225.—*Improvement in Self-acting Cheese Presses.*

What I claim as my invention and desire to secure by letters patent, is the combination and arrangement of two levers with their corresponding pairs of pulleys, having cords passing around them to their respective barrels, as substantially herein described.

BENJAMIN H. OTIS.

No. 6226.—*Improvements in adjusting the position of Plane Irons and regulating the Throats of Planes.*

What I claim as my invention and desire to secure by letters patent, is the regulation of the mouth in planes, so as to enlarge or diminish the same, and for the preservation of a close mouth in planes, as herein described, by a wedge or key (B,) being placed under the bit and fastened by a screw.

E. W. CARPENTER.

No. 6227.—*Improved Sash Stopper.*

I do not claim the case or the bolt separately, but what I do claim as my invention and desire to secure by letters patent, is the combination of the case and bolt, as herein described, for the purpose of holding the sash up or down.

WM. E. ARNOLD.

No. 6228.—*Improvement in Corn Shellers.*

The parts which I claim as my own invention, are the combination of the shute E, cylinder C, and shute J, for feeding and shelling the corn and discharging the cobs, as described.

JOHNSTON SMALL.

No. 6229.—*Improvement in Guides for Warpers.*

What I claim as my invention and am desirous of securing by letters patent, is the application of the principle of contraction and expansion to the "warper guide," and for the purpose of accomplishing this I will make use of a metallic coil of wire.

WHITING HAYDEN.

No. 6230.—*Elliptical or Oval Truss Frame for Bridges.*

What I claim as my invention and desire to secure by letters patent, is the union of the ordinary chords of a truss frame into *one continuous elliptical or oval curve*, in which the thrusts and tensions of the truss so constructed will operate in the manner set forth herein.

JAMES BARNES.

No. 6231.—*Improvement in Caoutchouc Springs.*

What I claim as my invention and desire to secure by letters patent, is the combination of helical springs made of metal, with, and placed within hollow springs made of metallic or vulcanized India rubber or any equivalent preparation of rubber, substantially as described, whereby the rubber is prevented from spreading laterally, and from chafing against the guide rod, and the tension of the rubber is increased by that of the helical spring, as described.

F. M. RAY.

No. 6232.—*Improvement in Thrashing and Grain Separating Machines.*

Having thus fully described my improved apparatus for cleaning grain,

what I claim therein as new and for which I desire to secure letters patent, is—

First. The straw carrier, constructed and arranged as above described, consisting of three or more revolving rakes so arranged as to cause the straw to turn over in its passage out of the machine, substantially in the manner and for the purpose set forth.

Secondly. I claim in combination therewith the apron (h,) as above made known. I also claim the elastic teeth (m',) placed opposite the revolving rakes for lightening the straw, combined with the teeth of said revolving rakes, and arranged as above specified. I also claim in combination with the above named straw carrier fgi, the revolving apron (o,) for conveying the grain to the screen, as set forth.

Lastly. I claim the moveable lower side rails (a',) and roller (x,) attached thereto, for the convenience of moving the machine, as herein before described.

ISRAEL J. RICHARDSON.

No. 6233.—*Improvement in Splint-Broom Machines.*

Having thus pointed out the nature of our invention, the best mode of constructing and using the same, and the various modes in which the principle or character of our invention can be applied, we declare that what we claim as our invention and desire to secure by letters patent, is—

First. Cutting a series of splints on, or from the surface of a block of wood, with a cutter, by a series of cuts in the direction (or nearly so) of the grain of the wood, substantially as described, in combination with a series of intermittent motions, that the splints may be cut in succession one after another along the entire surface of the block, substantially as described.

Secondly. Combining with the cutter that forms the splints on the block, one or more slitting cutters placed at the required distance from the main cutter, substantially as described, that each splint may be divided into two or more parts towards the point, as described.

Thirdly. The method of forming the splints thicker at the butt than at the point, substantially as described, by moving the block of wood towards the cutter, or the block and cutter towards each other, substantially as described.

And finally, the method of making the splints on the block shorter as they approach the centre of the block, by changing the position of the block or the cutter, or the range of motion of the cutter, substantially as described.

JOHN CRUM.
ABRAHAM LARWILL.

No. 6234.—*Improvement in Artificial Manures.*

Having thus fully shown and specifically described the nature of our discovery or invention, and given a full and exact description of the manner of making and using the same; now what we claim and desire to secure by letters patent, is the *residuum* from the manufactory of alum, and the residuum from the manufacture of epsom salts, in composition with any or all of the herein before described materials, for the purpose of making the mixture, or a modification thereof, as herein before described, which said com-

position or mixture is to be made in the way or manner, and to be used as herein before fully set forth.

PHILIP S. CHAPPELL.
WM. HENRY CHAPPELL.

No. 6235.—*Improvement in Grain Separators.*

Having explained the nature of my invention, its mode of construction and operation, I do not claim the endless web or elevator *b*, in itself as a new invention, but I claim the projections or pins *c*, on the said elevator, in combination with the rack or slat frame *d*.

I also claim the combination of the crank with the toothed roller *k*, to give the latter a traverse or side to side motion, all for the purpose herein described.

DANIEL WOODBURY.

No. 6236.—*Improvement in Printing Presses.*

Having thus fully described the manner in which I combine and arrange the respective parts of my cylinder printing press, and shewn the operation thereof, what I claim therein as new and desire to secure by letters patent, is—

First. The manner in which I combine the two cylinders in my printing press with their respective platforms, one immediately above the other, under an arrangement such as is herein described, by which each of the cylinders is made to take impressions from the forms on the platform, to which it appertains, the lower cylinder perfecting the sheet which has been printed on one side by the upper cylinder and forms,

I claim the manner of advancing the forms, and of carrying them under the cylinder by the gearing of the toothed wheels, on the ends of said cylinders, into teeth rising up from the edges of the chase or frame in which the form is locked up.

I claim the manner set forth of constructing the sliding carriages, and of combining them with the platforms and with the forms sustained thereon, by which construction and combination the form from which an impression has been taken is made to descend and pass back under the form last elevated, and is itself again elevated and forced forward; the respective parts of this apparatus being substantially the same in construction and operation with that herein described and represented.

JASON L. BURDICK.

No. 6237.—*Improved machinery for Drilling Rocks.*

I claim as my invention, the combination of the bars *a*, *b*, or any equivalent therefor, the frame G, and its journals and slide boxes, as constructed, adapted to one another, and made to operate together, substantially in the manner and for the purpose of supporting the drill and directing it into any desirable position, substantially as specified.

I also claim a combination made up of the following elements, viz:

First. Mechanism for throwing or moving the drill forwards, and drawing it backwards, when it is placed in such a position that it would not be advanced by the action of gravity alone, as it has heretofore been made to operate, the said mechanism being the crank shaft, cranks and connecting rods, directly connected with the slide frame W, and the supporting and

directing frame G, or any well known equivalent machinery applied to produce similar movements of the drill.

Second. The gripping apparatus, or that by which the drill rod is seized or clamped to the drill frame at the proper times, the same consisting of the bearings or jaws *t*, *u*, the wedge *v*, lever *w*, and spring *d'*, and its cross bar *e'*, directly over said jaws.

Third. The apparatus which causes the jaws to relax their hold of the drill and set it free or independent of the drill frame W, and so that it may be impelled forward by its momentum, and suffered to recoil without injury to the rest of the machinery, the same consisting of the cam block *z*, and its inclined spring *a'*, constructed and applied as described; it being expressly understood, that I lay no claim to any combination of machinery so arranged as merely to lift or draw back a drill, and so that it may act or fall against the substance to be drilled by the power of gravity alone, the invention or improvement claimed by me being a combination of such mechanism, and a mechanism for throwing or impelling the drill, independently of the power of gravity, in order that the drill may be placed and operated in any inclined position, as well as in a vertical position.

JOSEPH J. COUCH.

No. 6238.—*Improvement in Air-heating Furnaces.*

What I claim therefore as my invention, is the arrangement of the air-heating flues or spaces, in combination with the descending and ascending draft, as herein above described, so that the air to be heated shall enter and come in contact first with the coolest portion of the flue, and issue from the warmest into the air chamber.

HORACE BUSHNELL.

No. 6239.—*Improved Canal Steamboat.*

Having thus described the construction and operation of my improved steamboat for canal navigation, I desire it to be understood, that I do not claim to be the inventor of any of the parts of the same in themselves; but what I do claim, is the combination of the paddle wheel, having inclined buckets, with the wave queller arranged as herein described, or any other substantially similar manner, whereby the boat is propelled with comparatively little disturbance of the water or abrasure of the banks of the canal from the action of the wheel.

GRENVILLE PARKER.

No. 6240.—*Improvement in Spring Lancets.*

What I claim as my invention and desire to secure by letters patent, is causing the point of the lancet to sweep in an eccentric curve, simultaneously with its longitudinal movement in the case, by the combined action of the fixed stud *o*, in the carriage and the oblong aperture *i*, in the lancet, by which it is made to cut the vein with an oblique draw knife stroke, avoiding the tendency to rebound in cutting a tough vein or elastic skin, when thrown forward in a straight line at right angles to the vein, the *length* of the incision being increased or diminished by changing the position of the stud *o*, and its *depth* by turning the graduating screw G, of the carriage, as aforesaid.

JOSEPH IVES.

No. 6241.—*Improvement in shading Pictures by Metallic Leaves.*

What I claim as my discovery and desire to secure by letters patent, is the shading of gilded pictures by metallic leaves, and by the process herein described.

EMANUAL HARMON.

No. 6242. —*Improvement in Dyeing.*

What I claim as my discovery, and desire to secure by letters patent, is the peculiar compound of nitrate of potash, or nitrate of soda, and muriate of soda with the sulphuric acid and coloring matter, in manner and for the purpose herein described, by which I make a superior and much cheaper dye than has before been made to produce such colors in fabrics, when dyed in manner and for the purposes herein described and set forth.

SAMUEL MALLERD.

No. 6243. —*Improvement in Type casting Machines.*

Having now described my invention, and the operation of the same, I will proceed to state what I claim as my invention; Is the conical plug L, and arrangement of the clamber in which it works, in combination with the nipple and bath, and well of a type casting machine, substantially in the manner and for the purposes herein set forth; and also in combination with the conical plug L, I claim the arrangement of the levers O and S, and cam T, substantially in the manner and for the purposes herein set forth.

JOHN J. STURGIS.

No. 6244.—*Improvement in Self-lighting Lamps.*

What I claim as my invention, and desire to secure by letters patent of the United States, is the combination of a shaft actuated by springs which may be relieved from confinement, and turn the shaft with the disks and match, so as to bring it in contact with the igniting table, and present the blaze of the ignited match to the lamp, and light the same in manner herein described, by means of an alarm of any kind. ALEXANDER BENNETT.

No. 6245.—*Improvement in Harvesting Machines.*

Having thus described the construction and operation of my improved harvester, what I claim therein as new, and desire to secure by letters patent, is suspending the frame which carries the conveyor, reel and cutter upon the axles of the wheels A A′, when the frame thus suspended is hinged to the tongue and rendered capable of being turned upon its bearings by means of a lever for the purpose of elevating and depressing the cutter, as herein set forth.

JONATHAN HAINES.

No. 6246.—*Improvement in Spectacle Frames.*

What I claim therein as new, and desire to secure by letters patent, is combining either one pair, or any desired number of pairs of glasses or lenses in one frame, in manner and for the purposes substantially as herein set forth and described, so that if a glass or lens be moved, its mate or the other member of the pair will, by means of the interlocking of the teeth of the small wheels, sectors, or gearing, or its equivalent, have an equal or simultaneous motion, and each member of each pair will at all times be in a position corresponding with its mate, and this I claim, irrespective of the manner of uniting the bands

which surround the lenses with the connecting arms, or the means of combining the clutch bar with the clutch arms; not intending by this claim to limit myself to any particular form, number of parts or material, but to vary them as I may deem expedient, while I attain the same ends by means substantially the same.

I also claim that part of the apparatus which I have named the clutch arm, composed of a slider socket and slider, constructed and combined with each other in manner and for the purposes, substantially as herein set forth and described, whether such clutch arms are used in combination with the other parts of the spectacle herein described, or with parts of spectacles of any other description, and this I claim, irrespective of the eye formed on the end of the clutch arm, or the manner or means by which they may be combined with spectacles; not intending to limit myself by this claim, to any particular form herein named, or material, but to vary them as I may deem expedient, while I attain the same ends, by means substantially the same.

JACOB SHAW, Jr.

No. 6247. — *Improvement in Locomotive Baby Tenders.*

I claim and desire to secure as my invention, all the three upright posts or moveable arms, moving in or out, and operated by an increased power spring for the purpose intended and described. J. CUTTS SMITH.

No. 6248. — *Improvements in Reaction Water Wheels.*

What I claim as my invention and desire to secure by letters patent, is causing water to flow at pleasure in different directions from the centrifugal water wheel or engine, thereby reversing the direction of its revolutions.

JESPER SMITH.

No. 6249. — *Improvement in Planing Machines.*

Having thus fully described our invention, and the mode of operation, what we claim therein as new, and for which we desire to secure letters patent, is first, the combination of the disked cutter wheel (*e*,) and stationary bitt in the frame (*g*,) substantially in the manner and for the purpose set forth, the whole being constructed and arranged as above specified.

C. A. SPRING.
W. H. DERRICK.

No. 6250. — *Improvements in Deep Sea Diving Bells.*

Now we do not claim as our invention, the closed bell of itself, as a closed bell or vessel has already been used for submarine purposes; neither do we claim the attachment of two pipes, both leading from the bell to the surface, one for the ascending, and the other for the descending current of air, as that has heretofore been done; but what we do claim as our invention, and desire to secure by letters patent, is the combination of working rods with the diving bell, by means of ball and socket joints, or their equivalents, substantially as herein set forth.

J. AVERY RICHARDS.
J. W. WOLCOTT.

No. 6251. — *Improvements in Rotary Engines.*

Having thus fully described my improvement, what I claim therein as new, and for which I desire to secure letters patent, is the recess F, within the cir-

cle of the steam channel, in which is placed an expansion plate, on which the heat can act in the manner and for the purpose herein set forth, and having the friction of the revolving wheel confined to that part of the stationary case which can be made to expand and contract with said wheel, all as above specified.

JOHN CHAPLIN HOWARD.

No. 6252.—*Improvements in Bank Locks.*

Having thus fully described the nature of my improvements in the locks herein referred to, what I claim therein as new and desire to secure by letters patent, is the manner herein set forth of combining the slide C C, with the combined cams or escapement A A, and with the dog E, and the pin F, for the purposes set forth. I also claim the manner of combining the additional tumbler J J, with the revolving scutcheon under an arrangement, and for the purpose herein fully made known.

HENRY RITCHIE.

No. 6253.—*Improvements in Machinery for Turning Lasts, &c.*

What we claim as our invention and desire to secure by letters patent, is—

First. The method of finishing the heel and toe of the last by holding the pattern and last in cylindrical holders, and removing the centres and applying the cutters simultaneously to the toe and heel, substantially as above described. We, however, do not claim the revolving cylindrical holders, nor the mode of turning them, as described.

Second. We likewise claim the mode of varying the form or fashion of the last whilst turning, as described, by means of the adjustive pawls and pawl-wheel combined, with the machinery for operating the reverse patterns, as herein set forth.

ELBRIDGE WEBBER.
CHARLES HARTSHORN.

No. 6254.—*Improvements in Machinery for making Iron Wheel Tires.*

What we claim as our invention and desire to secure by letters patent, is the combination of the drawing out and forming rollers mounted on the vertical shafts, so geared and arranged that one can be moved towards and from the other, when this is combined with the bed plate for guiding and keeping the edge of the tire true, substantially as described.

We also claim, in combination with the drawing out and forming rollers, the employment of the auxiliary roller for determining the circle of the tire to be formed, substantially as described, when the said auxiliary roller is so connected with slide of the moveable forming roller, that the auxiliary roller may be adapted to the increasing diameter of the tire as it is being drawn out, as described.

THOMAS W. ALLEN.
CHAS. W. NOYES.

No. 6255.—*Employment of an auxiliary Engine in combination with the Condenser Pump.*

What I claim as my invention and desire to secure by letters patent, is the combination of the condenser of a steam engine for the propelling of a ship or other vessel, with a pump that receives the condensing water from outside of the vessel and causes it to pass the condenser when the said pump is operated by an auxiliary engine, substantially as herein described.

And I also claim the double connection of the condenser, that is with the exhaust of the propelling engine and with the boiler, substantially as described, when the said condenser is combined with a pump that receives the condensing water from outside of the vessel, and is impelled by an auxiliary engine, substantially as described. J. ERICSSON.

No. 6256.—*Improved Auger Stock.*

What I claim as my invention and desire to secure by letters patent, is—

First. The combination of the revolving adjustable handles with the stock, the same being arranged and operated substantially in the manner and for the purpose herein described.

Second. The combination of the turning collar on the shank of the auger with the stock, substantially as herein described, the collar to be grasped in the hand to guide the auger when beginning to bore a hole while being turned by the handle, adjusted so as to operate in the manner of a winch, whereby the auger is more steadily held and more readily entered into the wood, as herein set forth.

WILLIAM T. BARNES.

No. 6257.—*Improvements in Raising and Conveying Water.*

Having thus described our invention, we claim the combination of the spring cams K K, with the cap pieces of the carrier, the slide Q, and the bucket top for holding and releasing the carrier, as set forth.

We also claim the spring fork R, in combination with the bucket ring P, and the upright rod or arm D, to hold and release the bucket, and to catch again into the ring of the bucket at proper times, substantially as herein described and for the purpose set forth. JOHN J. COX.
SAM'L P. COX.

No. 6258.—*Improvement in Saws.*

What I claim as my invention and desire to secure by letters patent, is the moveable and loose teeth (B & C,) in any kind of saw, regardless of shape or form, or manner of insertion, for I am aware that they can be made in other shapes aud placed in blades made different that would answer as well.

EBENEZER CLARK.

No. 6259.—*Improvements in Machinery for Picking Wool, &c.*

What we claim as our invention and desire to secure by letters patent, is the forming of the concave of a series of rolling bars geared together at the ends, in the manner and for the purpose specified, in combination with the picker cylinder, as described, and finally, we claim in combination with the picker cylinder, the slow turning rollers placed above the delivery, substantially in the manner and for the purpose specified.

REUBEN DANIELS.
ALBERT G. DEWEY

No. 6260.—*Improvement in Boot Crimps.*

Having thus fully described our invention, what we claim therein as new, and for which we desire to secure letters patent, is the combination and a-

rangement of the moveable parts *e c* and *a*, of the clamp, with the stationary part *x*, in the manner set forth.

SARDIUS PASCO.
ELIHU PERRY.

No. 6261.—*Improved Awl Haft.*

Having thus described my improvements, I shall state my claim as follows: What I claim as my invention and desire to have secured to me by letters patent, is a tool handle or awl haft, having split shaft for the holding the tool, which is *forced outwards* by a screw shaft, attached to the under side of the cap, and abutting against the top of said split shaft, as herein above set forth; said screw shaft being worked substantially as herein above specified.

D. H. CHAMBERLAIN.

No. 6262.—*Machine for paying seams of Vessels.*

What I claim as my invention, and for which I desire to secure letters patent, is the revolving paying wheel, in combination with the supply box, or with the supply box and feeding wheel, the whole constructed and operating substantially in the manner and for the purposes herein described.

SAMUEL BAKER.

No. 6263. — *Improvement in Lubricating Compounds.*

Having thus particularly described our invention, what we claim therein as new, and desire to secure by letters patent is—

First. The combining of *potash (or other alkaline substance)* with *water* and *oil*, *lard*, or *resin*, (or other oily, fatty, or resinous substance,) by the process substantially as herein described, into *a neutral or nearly neutral compound as a base*, for a lubricating mixture, substantially as above described.

JOHN CUMBERLAND.
WM. W. CUMBERLAND.

No. 6264. — *Improvement in Cooking Ranges.*

Having thus described my cooking range, I proceed to state what I claim as my improvement, and for which I desire letters patent:

First. I claim the syphon shape of the air chamber for the purpose of moderating the heat acting on the side of the oven nearest the fire chamber, substantially as above set forth.

Secondly. I claim the special arrangement and combination made by me, of the ovens, fire chamber, draft, ash pit and syphon chamber, as herein set forth.

F. S. MERRITT.

No. 6265. — *Machine for Spherifying Bullets or Pills.*

What I claim as my invention and desire to secure by letters patent, is the oblique gyration of one hemisphere within another, for the purpose of spherifying any mass of matter, in the manner above described.

I also claim the sloat F, or any outlet for the purpose of letting out the bullets.

JONATHAN F. OSTRANDER.

No. 6266.—*Adjustable Dam or Water Wier.*

What I claim as my invention and desire to secure by letters patent, is the combination of the two inclined leaves or float gates with each other, and the

paddle gates, the whole arranged as described, between abutments, and forming an adjustable dam and waste wier.

MILOW S. WHEATON.

No. 6267. — *Improved Gold Washer.*

What I claim as my invention and desire to secure by letters patent, is the method of separating gold from earthy matter, by means of a rotating inverted conical pan provided with an internal spiral flanch, substantially as herein described.

WM. H. JENNISON.

No. 6268. — *Concentric Centrifugal Gold Washer.*

Having now explained how my said invention may be constructed and put into practical operation to produce the effect above specifieed—

What I claim as my invention and desire to secure by letters patent, is the machine consisting of two hollow vessels, of convenient thickness and size, placed one within the other so as to leave a space between them, and revolving so as to prepare the gold and mass of other matter with which it is mixed, and also to separate the gold from such other matter, substantially as described.

JAMES H. BULL.

No. 6269. — *Improvement in Cast Iron Car Wheels.*

Having thus fully described our improvements in forming and constructing a solid cast iron wheel, what we claim therein as new, and for which we desire to secure letters patent, is the combination herein described, of arms and flanges or plate, said flanges, or plate and arms being curved substantially in the manner and for the purposes set forth, reference being particularly made to the drawing, for description.

CARMI HART.
NATHAN WASHBURN.

No. 6270. — *Double Hinged Water Guard.*

I do not claim to be the inventor of the single hinged water guard, nor of a mere application of such a guard; but what I do claim as my invention, and desire to secure by letters patent, is the double combined guard, with the lower guard hinged to the upper one, and protected by the lip or outside fender thereto attached; the whole constructed and acting substantially in the manner herein described.

JOHN BURT.

No. 6271. — *Improvement in Hulling Machines.*

What I claim as my invention and desire to secure by letters patent, is first, the combination of the screw section D', of the cylinder with the ribbed or toothed section D, arranged and operating in the manner and for the purpose herein set forth.

DAN PEASE, Jr.

No. 6272. — *Improved Bank Lock.*

I lay no claim to a series of changeable bitts affixed in, or combined with a key, nor do I claim a cylinder to be rotated by a key made with either stationary or changeable bitts, nor the combination of such a cylinder, one or more series of pins or slides, and an enclosing ring, as used in the lock invented and patented by Linus Yale, nor do I claim a series of slides and a notched ring plate, as used in the well-known Bramah's lock; but that which

I do claim as my invention, is a combination of the following elements, as applied to the main bolt of a lock, and operated by a key made with either fixed or changeable bitts, the whole being arranged and constructed substantially as herein before explained.

The first of said elements of combination is a notch, a shoulder, or any mechanical equivalent therefor, made in the main bolt, or otherwise properly applied to it.

The second of the said elements is the spring dog C.

The third of the said elements is the catch plate or lever plate D, turning on a pin projecting from the main bolt, and having a spring affixed to it, and the bolt for the purpose of throwing the plate down into the notches of the slide plates.

The fourth of the said elements is a series of notched slide plates *n*, *n*, *n*, &c., arranged within a cylinder or rotating shaft E, provided with retractive springs, and constructed and made to operate in line of the axis of the cylinder or shaft, essentially as above specified.

The fifth and last of said elements is the rotating shaft or cylinder E, made substantially as above described, and provided with a bitt or stud for operating in a notch *b*, made in the main bolt, and for the purpose herein before specified.

DAVID M. SMITH.

No. 6273.—*Improvement in Brakes for Railroad Cars.*

Having thus fully described the manner in which I construct my horizontal brake and the operation of the same, what I claim therein as new and desire to secure by letters patent, is the application of a truck to locomotive and railroad cars, so as to act upon the track rails, in combination with its several parts, constructed as specified, operating in the manner substantially as described and for the purpose set forth. And it is hereby distinctly understood, that I do not intend by this claim to limit myself to the precise form of said horizontal brake, but to vary the construction and machinery, and apply such as may be deemed expedient, while the effect produced is substantially the same.

LEVERETT TREADWELL.

No. 6274.—*Improved method of ensuring the action of the Valves in direct action Pumping Engines.*

Having thus described our improvements, what we claim as new and desire to secure by letters patent, is the removing or reducing the resistance against the pump piston in direct action steam pumps, at the proper time in the stroke, by effecting a connection between the water on both sides of the piston, in order to allow either the momentum of the moving parts, on the expansion of the steam already within the cylinder, or both conjoined to act as explained, to throw the steam valve across the ports with certainty, whether at high or low speeds.

Second. We claim the method herein described of effecting the before mentioned and claimed object, namely, by making two passages into each end of the cylinder, across one of which the piston is forced, opening by this means free communication between the two ends of the cylinder.

HENRY R. WORTHINGTON.
WILLIAM H. BAKER.

No. 6275.—*Improvement in Bedstead Fastenings.*

I do not claim the invention of the open hook lock, such as Gaunt uses, crossed at right angles, having a bevelled hook on one of the tenons, and a bevelled projection and swell on the other, and large cast iron tenons that enter the posts; but what I do claim as my invention and improvement on Gaunt's patented bedstead fastening and desire to secure by letters patent, is making an oval opening through the tenon of the end rails through which the tenon on the side rail is passed, and forming a spiral bevel around said opening, against which the bevelled projection on the tenon of the side rail acts in the manner of a screw, as it is turned, causing the two tenons thus interlocked to act in perfect unison, and to draw the shoulders of the end and side rails simultaneously against the sides of the posts, and to make perfect joints, without the liability of breaking the spiral bevels, said bevels being of great strength, arising from their continuous and unbroken form, the parts sustaining each other around the oval opening, by which a simultaneous movement of the posts toward the shoulders of the rails is effected, by simply turning the two side rails, as above described.

JOHN D. SANBORN.

No. 6276.—*Improvement in Carriage Springs.*

What I claim as my invention and desire to secure by letters patent, is—

First. Making the plates of elliptic and other carriage springs, of a transversely or diagonally crimped, flutted or ribbed form, substantially as herein described, by which they are rendered universally flexible, and can be made of a given strength with less material and expense than the common elliptic spring.

Second. The combination of the crimped spring, with a semi-elliptic many leafed spring, in the manner and for the purpose herein set forth.

HIRAM T. HYDE.

No. 6277.—*Improved Punching Machine.*

What I claim as my invention and desire to secure by letters patent, is the combination of the knuckle and its attached lever with the toggle G, and connecting rods E, arranged and acting as described, so that by a motion in one direction of the lever the punch can be both raised and depressed.

STEPHEN KENDALL.

No. 6278.—*Improvement in Metallic Pens.*

What I claim as my invention and desire to secure by letters patent, is—

First. The providing the pen with a slit or opening extending nearly through its entire length, substantially in the manner and for the purpose herein described.

Second. And in combination with such slit I claim forming an oblique pen, substantially in the manner herein described.

MATTHEW S. FIFE.

No. 6279.—*Combination of Ash Trap with Puddling and Re-heating Furnaces.*

What we claim as our invention and desire to secure by letters patent, is making a depression in the roof of re-heating or puddling furnaces, in front of the arresting bridge, that is, between the fire and a bridge next to the

heating or the puddling bottom, for the purpose of throwing down and arresting the solid particles of coal, ashes, and other matter upon a space or chamber provided for the purpose, substantially as described, in combination with the heating or puddling bottom or bottoms of re-heating or puddling furnaces, whereby the iron under treatment is protected from the injurious effects of the solid matters carried up from the grate by the draught or blast, as described.

LEWIS SCOFIELD.
EDWARD COOPER.

No. 6280.—*Improved method of mounting Porcelain Roses for Doors.*

I claim as my improvement, the metallic socket, constructed substantially as above described, in combination with a mineral porcelain or glass rose, the whole being arranged, adapted together, and used substantially in the manner herein described.

JAMES BELL.

No. 6281.—*Improvement in Dress-pins.*

My claims in the above described invention for which I desire to secure letters patent, are confined to the construction of dress pins, hair pins, &c., made from *one entire piece of wire or metal,* (without a joint or hinge or any additional metal except for ornament,) forming said pin and combining with it in *one and the same piece of wire,* a coiled or curved spring and a clasp or catch, constructed substantially as above set forth and described.

WALTER HUNT.

No. 6282.—*Improvement in elevating the tops of Piano Fortes.*

What I claim as my invention and desire to secure by letters patent, is the connecting the main portion (A,) of the top of a piano to the body or case of the instrument in such a manner that either its front or rear edge can be elevated at pleasure, to allow a free escape of sound, and enable the performer at the same time to see and be seen; to wit, by means of the metallic hinge bars B B, combined with the said main portion of the top of the piano and inserted into guiding metallic supports and steadying grooves or apertures at each extremity of the instrument, substantially in the manner herein set forth. Not intending however to limit myself to the precise mechanical construction and arrangement of parts as herein represented and described, but to vary the same as I may deem expedient, whilst I attain the same end by means substantially the same.

CONRAD MEYER.

No. 6283.—*Instrument for Drawing Spikes.*

What I claim as my invention and desire to secure by letters patent, is forming the lower end of the metallic bar A, (provided with a handle *a*, at its opposite end,) somewhat after the form of a cima-reversa, and brought to an edge, and attaching to the same by means of a pin or bolt *f*, a curved slotted casting B, made of a bill hook form at one end *c*, and also brought to an edge at that end and bent at right angles at the other *d*, in such a manner that by placing the right angle end of said casting on a solid basis, and grasping the spike or nail between the edges of the casting B, and bar A, and depressing the handle, the spike or nail will be drawn from the material into which it is driven, with the greatest facility, as herein set forth, or in any other mode substantially the same.

PATRICK BRYANT.

No. 6284. — *Improvement in Thrashing Machines.*

What I claim as my invention and desire to secure by letters patent, is the peculiar form of the teeth H, by which cloverseed can be hulled and grain thrashed in the same machine, each of said teeth being a combination of a jagged semi-ellipse, a trapezoid, and a shank, as herein described and represented.

T. N. SHIPTON.

No. 6285. — *Improvement in Bee-Hives.*

What I claim is the manner of combining and arranging the upper and lower rods, or entrance passage, with the main or central hives, as herein set forth; said rods or passages being long and narrow for the purpose before mentioned, and so constructed that while the external communication is cut off, the ventilation may still go on by the means herein above described.

STEPHEN TITCOMB.

No. 6286. — *Improvement in Tailors' Measures.*

Having thus described my invention, I may add that I do not claim the use of a square for protracting garments on the cloth to be cut, as that instrument has long been in general use for that purpose, nor do I claim taking measures on the person in any way different from that in common use, nor do I contemplate using my tailors' mathematical protractor, for the purpose of taking measures on the person, its great purpose being, as herein described, to delineate correctly such measures on the surface of the cloth.

What I do claim as my invention and desire to secure by letters patent, is the combination with the square of the exterior radial arm *a*, and the interior radial arm *b*, having thereon the several scales divided and numbered as herein represented, for the purpose of protracting garments from measures taken upon the person, in the manner substantially as herein set forth.

'OHN CARPENTER.

No. 6287. — *Improvement in Machines for Dressing Stone.*

What I claim as my invention and improvement and desire to secure by letters patent, is the construction of the staging for carrying the stone, consisting of a moveable platform capable of raising and lowering, in combination with the frame for producing the reciprocating motions, so that these several motions may be had singly or in movements variously combined, substantially in the manner and for the purposes described.

CHARLES WILSON.

No. 6288.—*Improvement in the Spring Lancet.*

What I claim as my invention and desire to secure by letters patent, is the combination of a counter spring (*d*,) and spring catch (*g*,) with the shank of a spring lancet, substantially in the manner and for the purpose herein set forth.

JAMES H. JOHNSON.

No. 6289.—*Improvement in Hulling Machines.*

What I claim as my invention and desire to secure by letters patent, is—

First. The combination of the radial wedge formed rubbers D^2, and seg-

ment wings D^3, on the lower end of the cylinder D, arranged and operating in the manner and for the purpose herein set forth.

Second. I claim constructing the horizontal bed plate of the stationary cylinder, with curved segment ribs around the centre of the bed plate in combination with the radial ribs, arrranged and operating in the manner and for the purpose set forth.

DAN PEASE, Jr.

No. 6290.—*Improvement in Skiving Leather.*

What I claim and desire to secure by letters patent, is the combination of the blade C, roller D, and inclined or horizontal carriage A, as seen in figs. 4 and 3, for pressing down and skiving to a bevel, or to a level or even thickness the leather, as described.

I also claim the combination of the eccentric (G,) and springs (E,) with the clamp (B,) as an apparatus for confining and disengaging the leather, in the manner above described.

BENJAMIN S. MATHEWS.

No. 6291.—*Improved Nail Plate Feeder.*

Having thus fully described the machine or nail feeder, what we claim as the invention of the said William Diehl, deceased, and which we desire to secure by letters patent, is the combination and application of the rack wheel P, its axle and the springs upon it, and the outside wheel O, the ratchet Q, and the two levers J and K, for pushing and holding it, and again letting it be drawn back by the weight, in the manner and for the purpose herein set forth.

HANNAH DIEHL.
CHARLES M. DIEHL.

No. 6292.—*Improvement in Cooking Stoves.*

What I claim as my invention and desire to secure by letters patent, is the combination of the perforated plate G, with the revolving tables E, E, and cylinder F, for the purposes above set forth.

I also claim as my invention, the manner of using the moveable grate, adjusted by a lever, in the bottom of the cylindrical furnace.

FITCH R. BABCOCK.

No. 6293.—*Improvement in Shaving Brushes.*

What I claim as my invention and desire to secure by letters patent, is the introduction of the soap, by means of the screw and tube, through the handle into the brush, by which it may be fully impregnated; and also the combination in *one* of the box and brush, thereby saving time and trouble, for it is only necessary to wet the brush, and while the lather is making on the face the beard is softened.

W. S. JEWETT.

No. 6294.—*Improvements in Planing Machines.*

Having thus described my invention, what I claim as new and desire to secure by letters patent, is the method of holding the board firmly against the bearing bench or roller of a planing machine, by means of the obliquely placed rotary guides, firmly pressed against the edge of the board, and drawing it to the bed in the manner substantially as herein set forth.

I also claim the oblique rotary guides, herein described, in combination with a cutter wheel, having bevels or off-sets around its face, and also with the adjustable plates in front of the smoothing cutters set in its plane face, as herein set forth; not confining myself to the precise arrangement described, but varying it to obtain the same ends by means substantially the same

HAZARD KNOWLES.

No. 6295.—*Improvement in the manufacture of Twine.*

Having described the nature of my invention or improvement, and the manner in which it is applied, I do not claim the saturating of yarns or strands of cord or twine with tar, and twisting said yarns or strands, while so saturated, into cord or twine, as the nature of such tar would be weakening and soiling, and not adapted to the end and objects designed to be attained by this invention; nor do I claim, generally, the application of gelatin, glutin, starch, or glue, to twine or cord for the purpose of sizing—I disclaim the substances used as sizing, separately; and I also disclaim the manner in which it is applied, separately—but I claim the two processes combined, that is to say, I claim the saturating of the cotton yarns or strands separately with gelatin, glutin, starch, or glue, or any convenient combination or composition of these or any other viscous or analogous substance, while in a liquid state, preparatory to and for the purpose of being twisted, and in combination with the twisting the said cotton yarns or strands, while so wet and saturated, at one operation, into twine or cord, thereby producing the results herein before set forth; and, therefore, by so twisting it, in combination with the saturating of the yarns at one operation, I both save time and expense in the process of manufacture, and at the same time produce a better article, for the purpose of untarred wrapping twine, than is produced by any other known process, thereby giving the article an internal saturation with these tenacious and preservative substances, which imparts strength, as aforesaid, superior to a tar saturation, without the weakening and soiling properties of tar.

THOMAS G. BOONE.

No. 6296.—*Improvement in machinery for Dressing Shingles.*

Having thus described my improved machine, I wish it distinctly understood that I lay no claim to the mere invention and use of two knives, arranged and operated as above described, and for the purpose of shaving a shingle, but that which I do claim as my improved organization or combination of mechanism for holding, shaving and discharging the shingle, the same consisting of the following elements, as constructed and made to operate substantially as specified, that is to say—1. The knife frames D, E, and cutting knives. 2. The system of pressure rollers and their supporting springs. 3. The spring holder I. 4. The bearer C. 5. The spring holder K. 6. The spring discharging and receiving bars o^2, p^2—meaning to claim the spring holders, the bearer, and the spring receiving and discharging bars, in combination with one another and the cutting planes, and as constructed and made to operate therewith, substantially as above described.

LEWIS STOCKWELL.

No. 6297.—*Undetachable Swinging Bottle Stopper.*

Having thus fully described my improved bottle stopper, what I claim therein as new and desire to secure by letters patent, is the manner of closing the mouth of a bottle by means of the undetachable metallic cap A, having cork or India rubber, or both, placed in the top of the same, and secured to the neck of the bottle, by means of the ring *c*, the joint pins *f*, *f*, and the grooves *d*, in the bottle neck, substantially in the manner herein set forth.

ARCHIBALD H. FORBES.

No. 6298.—*Improvement in Churns.*

Having thus fully described the nature of my improved churn, and shown the operation of the same, I wish it to be understood, that I do not claim either of the individual parts or devices herein described, when taken separately and alone; but what I do claim as constituting my invention and desire to secure by letters patent, is the particular manner in which I have combined and arranged those parts, so as to adapt them to the churning of cream, as set forth, that is to say, I claim the combination upon the same shaft of two spiral float wheels, so arranged as to force the cream from the ends of the churn box towards the centre, as described and represented.

HENRY F. BAKER.

No. 6299.—*Folding Centre Board.*

Having thus described the construction and operation of my improved centre board, and the manner in which the same may be applied to flat bottomed vessels, what I claim therein as new and desire to secure by letters patent, is—

First. What I claim in the foregoing as my invention and for which I solicit letters patent, is suspending in a jointed frame a centre board composed of one or more pieces capable of being turned with either their edges or sides to the bottom of the vessel, and with the frame folded up against or projected down therefrom, as herein set forth, whether the several parts be arranged as described, or in any other substantially similar manner.

And likewise hanging the above claimed apparatus, so that it is capable of being turned obliquely across the keel for the purpose of counteracting the lee way of the vessel, substantially as herein set forth.

J. M. HOFFMAN.

No. 6300.—*Improvement in Machines for cutting Gaiter Boots.*

I therefore claim as my invention and desire to secure by letters patent, the machine with heads, with or without a division, with patterns adapted to its use, consisting of cutting and moulding ladies' and gentlemen's gaiter and half gaiter boots to any size, of any material, without a seam—thereby saving fifty per cent. in labor, and surpassing the old plan in neatness and durability.

WILLIAM SNELL.

No. 6301.—*Improved Air Engine.*

What I claim as my invention and desire to secure by letters patent, is combining with the surrounding cooling vessel, a hollow plunger, made with its

external and internal surfaces of some conductor of caloric, separated by some non-conductor, substantially in the manner and for the purpose specified.

And I also claim the hollow plunger, substantially as herein described, in combination with the heater, which it alternately covers, substantially as herein described for alternately heating and cooling the air, as described.

J. LAUBEREAU.

No. 6302.—*Improvement in Extension Tables.*

I do not claim to have invented any of the parts used herein for these purposes, as taken separately they are well known; but I do claim as new and of my own invention, and desire to secure by letters patent of the United States, the application to extension tables of slides formed with alternate and interrupted tongues and grooves *f f*, in the faces, to carry the weight off and on the table, and kept together by metal stops *b* and *e*, and slide keeper pieces *a* and *d*, having lips to operate in grooves *c*, on the edges of the slides for that purpose, substantially in the manner described and shown.

THEODORE FRANCK.

No. 6303.—*Revolving Cradle for unloading Canal Boats or Sections thereof.*

We do not claim as a platform on which to support the boat or section thereof, any of the dumping cars now in use, none of which would permit the boat or section to be turned completely upside down while resting thereon,—nor do we claim suspending the boat or section thereof from a crane without the intervention of a cradle; but what we do claim as our invention and desire to secure by letters patent, is a revolving cradle suspended on gudgeons, to receive and securely hold a boat, or section thereof, said gudgeons being atached either to a railroad truck or the bail of crane, or other hoisting machinery, in such a manner that the cradle may be revolved to such an extent as to turn the boat or section upside down, substantially as described in the within specification.

JOHN ELGAR.
BENJAMIN HALLOWELL.

No. 6304.—*Improvements in Planes for Bevel Edges.*

What I claim as my invention and desire to secure by letters patent, is the manner herein described of planing the edges of pieces of wood of a bevelled form at given uniform or varying angles, by means of an adjustable guard hinged to the plane stock.

WILLIAM H. BLYE.

No. 6305.—*Machine for regulating the Twist and Diameter of Screw Augers.*

We do not claim as our invention the plates or dies, as such, neither do we claim any other of the parts or combinations of the machine, except as follows, to wit: We do claim as our invention and improvement and desire to secure by letters patent, the raising upon and securing to the surface of level metallic or other plates, composed of hard substance, wales or beads, running either in straight or curved lines, and operated substantially in the manner

above specified for the purpose of forming and perfecting the twist of double and single twist screw augers.

NATHANIEL C. SANFORD.
LUCIUS B. SMITH.

No. 6306.—*Sliding Cut-off Valve.*

I claim the method of constructing and arranging sliding valves of steam engines, with their corresponding openings into steam passages, together with the regulating apparatus attached to said valves, so as to operate the cut-off valves by the same rod which moves the eduction valves, also so as to permit the adjustment of the cut-off valves, in such manner as to close the steam passages, at various preconcerted portions of the stroke by hand gearing during the operation of the engine, all in manner and form as set forth in the within specification and drawings.

SIMON P. WINNE.

No. 6307.—*Improvement in Fan Chairs.*

What I claim as my invention and desire to secure by letters patent, is the manner herein described of diffusing perfumes and producing currents of air to fan and cool the occupants of either stationary or rocking seats by means of bellows and tubes, whether the several parts be arranged and operated as herein set forth, or in any other substantially similar manner.

DANIEL LINZIE.

No. 6308.—*Improved Rotary Gold Washer.*

What I claim as my invention and desire to secure by letters patent, is the application and combination of the helix or screw *h h*, with a revolving cylinder *a*, and the short strips *k k*, at the upper end of the cylinder, substantially in the manner and for the purpose herein before named.

H. PARRY.

No. 6309.—*Improvements in Planing Machines.*

What I claim as my invention and desire to secure by letters patent, is combining with stationary cutters in a planing machine, reciprocating clamps which increase their pressure as the resistance to the advance motion of the board increases in such manner that said clamps give a rapid intermittent or reciprocating motion to the stuff, whereby the clogging of cutters is prevented, and smooth work secured, substantially in the manner herein set forth.

I also claim the passage V, and the scraper *n*, arranged and operating as described, in the rear of the throat of the plane, for freeing the plane from stray shavings, and for preventing the clogging of the cutters, in the manner substantially as herein set forth.

I also claim the gauging pressure spurs *i*, placed in front of the plane cutters for retaining the board in its due position in contact with the bed of the plane frame Q, as herein set forth, not intending in these claims to limit myself to the exact arrangements described, but to vary the same at pleasure, while I attain the same ends by means substantially the same.

HERVEY LAW.

No. 6310.—*Machine for Carving Wood or Metal.*

What I claim as my invention and desire to secure by letters patent, is combining with a rotating cutter, which has only an endwise motion for determining the depth cut, substantially as described, a compound sliding table (which carries the material to be carved) operated by a system of pentagraph levers provided with a pointer or tracer, that all the motions given to the tracer may be communicated to the material to be carved, substantially in the manner and for the purpose specified.

ISAAC M. SINGER.

No. 6311.—*Machine for making Suspender Buckles.*

What I claim as my invention and improvement, and desire to secure by letters patent, is the combination of the dies with the central joint of the toggle (*g g*,) for holding the wire, and forming the recessed figure upon it, as described, the combination of the cross head (*d*,) arms (*h h*,) and lever (*c c*,) operating together as described. I also claim the combination of the levers (E,) and pointers (S,) arranged within the die, and acted on by the levers *(c,)* for punching the holes in the ends of the bow, the whole made and operated as shown in figs. 4 and 5; I also claim the safety bar *(f,)* operated by the cam *(i,)* against the toggles, for the purpose of keeping the toggles in their straightened position until the punching machine is withdrawn, and thereby permit the discharge of the finished bow, as described.

WM. SCARLETT.

No. 6313.—*Apparatus for Drilling Submarine Rocks.*

What I claim as my invention and desire to secure by letters patent, is the adjuster D, with its cap, lens, adjusting screws, elastic circles, and circular pads. I also claim the combination of the chamber A B, with the adjuster D, tube G, adjusting pins J, and with the guide posts R R, constructed and arranged substantially as herein described.

THOMAS KENDALL.

No. 6314.—*Improvement in Bedsteads for Invalids.*

Having thus described the construction and operation of my improved bedstead for invalids, what I claim therein as new, and desire to secure by letters patent, is first, the combination of the adjustable suspension frame *c* and *d*, with the fixed frame *a*, the several parts being made and arranged substantially in the manner and for the purpose herein described.

Second. The combination of the sheets, and the rollers upon which they are wound with the bedstead, substantially as described.

Third. The combination of the shower box and steaming apparatus, with the curtained compartment, substantially as herein described.

ISAIAH BUCKMAN.

No 6315.—*Improvement in Spectacle Frames.*

What I claim as my invention and desire to secure by letters patent, is making the *temples* of spectacles, either in whole or in part, *hollow or tubular*, of either a cylindrical, square, or any other shape, said temples operating substantially in the manner and for the purpose herein above set forth.

JOSEPH. J. LOW.

No. 6316.—*Improvement in Looms for Weaving.*

What I claim as my invention and desire to secure by letters patent, is the method substantially as herein described, of withdrawing the wires from the raised warp or figuring of the fabric, carrying them forward and replacing them again in the shed by means of rolls, receiving their different motions from machinery arranged as herein set forth, or in any other substantially equivalent manner.

I also claim giving to the shuttle box a vertical alternating motion, for the purpose of directing the shuttle through the shed, alternately above and below the ground warp, when the ground warp remains constantly stretched in the same plane, and the shed is formed simultaneously with the elevation and depression of the shuttle box, by the alternate deflection of the covering warp above and below the ground warp, substantially as herein set forth.

AUGUSTUS FAULKNER.

No. 6317.—*Improvement in Distilling Apparatus.*

What I claim as my invention and desire to secure by letters patent, is distilling and rectifying spirituous liquors and turpentine by causing a current of steam to pass up through a series of perforated metal, slate, soap stone, or other plates securely fixed in a steam tight vessel, and provided with drop pipes and receivers below, through or over which the wash or other article is descending; the apparatus therefor being constructed substantially in the manner described.

I also claim the use of slate or soap stone plates for this purpose, with or without the combination of the drop pipes and receivers, made and used as described.

GEORGE RILEY.

No. 6318.—*Improved method of expanding Metallic Pistons.*

What we claim as our invention and desire to secure by letters patent, is the setting out or tightening of metallic packings by means of the series of cams *e e e*, in combination with the sliding rods *f f f*, and with the springs *r r r*, when the whole are operated simultaneously, by turning the single cam head or shank A, substantially in the manner herein set forth.

We do not intend in this claim to limit ourselves to the exact number or arrangement of parts herein described, but to vary the same at pleasure, while we attain the same ends by means substantially the same.

JAMES TOUCHSTONE.
J. H. CLARK.

No. 6319.—*Improvement in Straw Cutters.*

Having thus fully described my improvement, what I claim as my invention, and for which I desire to secure letters patent, is the combination of the toggle joint with the crank shaft *h*, for the purpose of operating the knife, and giving the double or accelerated motion, substantially as above set forth.

ISRAEL J. RICHARDSON.

No. 6320.—*Improvement in Corn Shellers.*

Having thus fully described my improved apparatus for shelling corn, what I claim therein as new, and for which I desire to secure letters patent, is first,

the projections or horns *o'*, with the angular notches X, between the horns and the front edge of the jaw, for removing the grains or rows of corn that pass between the angles of the jaws; secondly, I claim in combination with the jaws, the guides *i*, constructed and operated as described, for stripping the grain from the cob when moved forward by a piston or its mechanical equivalent.

ISRAEL J. RICHARDSON.

No. 6321. — *Improvements in Cog Gearing of Locomotives for ascending Inclined Planes.*

What I claim as my invention and desire to secure by letters patent, is first, the combination of the intermediate cog wheel H, with the pinion G, on the propelling axle F, and stationary cogged rail *r*, into which the intermediate cog wheel H, is made to match or gear when required for ascending inclined planes; said intermediate cog wheel being hung upon a moveable shaft, and kept in gear with the rack by means of a weight or spring, whereby difficulties arising from the inequalities in the road, or others, incident upon the use of a rack and pinion for ascending inclined planes, are avoided as herein fully set forth.

Second. I also claim the mode of locking, by the employment of the cog wheels S and T, in combination with the pinion G, and intermediate cog wheel H, and rack rail *r*, as described.

WM. HOYT.

No. 6322. — *Improvement in Endless Bands for Grain Dryers.*

Having thus explained my invention, I do not claim an endless web or apron made of metal, but I claim the combination of an endless apron made of various pieces of plate metal constructed with joints, united by axles which project below the inner surface of the web or apron, with octagon or hexagon rollers, constructed with grooves in the said rollers, to receive the projection or axles of the endless apron, (meshing into one another) the whole constructed and operating in the manner herein set forth.

JOHN MASSEY.

No. 6323. — *Vibrating Sash Stopper.*

Having thus explained the nature of my invention, and its operation, I claim the combination of the key, fig. 2, with the escutcheon J, and the catch button D, operating as described, to make the catch button project into the rack side of the sash, to hold or retain the window, substantially as described.

WM. FERRELL.

No. 6324. — *Piston Valve Cut-off.*

What I claim as my invention, and desire to secure by letters patent, is the cut-off, composed of two cylindrical portions or rings working steam tight with the sides of the steam chest, and also fitting steam tight, when brought alternately in contact with the flat surfaces of two pistons, between which said cut-off works, whereby steam is prevented from passing into the working cylinder of the steam engine, while either the cut-off alone, or the cut-off and piston together, are passing by the steam passage, said cut-off being moved

by the pistons, and attached to each other, substantially in the manner herein described.

GORDON McKAY.

No. 6325. — *Revolving Die Spike Machine.*

What we claim as our invention in each set of griping and beading dies of the series, is the combination of the fixed die *n*, the moveable die O, the curved bar P, the cam plate Q, with its cam, and the arc or cam R, the said being applied to the shafts M T, and adjusted together, and made to operate essentially in manner as herein before specified.

We also claim the combination of the series of rotating pointing and severing dies A B C D, the conductor L, and the series of griping and beading dies, as constructed, combined and arranged, and made to operate substantially as herein above described.

AMI M. GEORGE.
EPHRAIM BROWN.

No. 6326. — *Improvements in Machinery for Cutting Veneers, &c.*

What I claim as my invention, and desire to secure by letters patent, is the method of cutting veneers, substantially as herein described, by means of a knife (or knives,) having a longitudinal sliding or vibrating motion during the operation of cutting, when this is combined with a box (or boxes) on a rotating shaft, that by its revolutions it may carry the block to and over the knife, substantially as herein described, whereby the operation of cutting veneers by means of a sliding or vibrating knife to give the draw cut, may be made continuous, as described.

And I also claim the method, substantially as herein described, of communicating the feeding motion to the follower (or followers) in the feeding box (or boxes) by means of the arm (or arms) so connected with the main shaft, or the equivalent therefor, that it may have a motion independent thereof, and connected with the follower (or followers) in the feed box (or boxes) and operating as herein described, or in any other manner essentially the same in principle.

E. B. CHEREVOY.

No. 6327. — *Improvement in the Manufacture of Paris Green.*

What I claim as my invention, and desire to secure by letters patent, I specify and point out as follows, viz:

First. The process of dissolving the blue vitriol by pouring on it while the vitriol is in a dry state, the hot saturated solution in water of arsenic and carbonate of soda, as described in paragraph B.

Secondly. The process of dissolving the dry carbonate of soda by pouring on it the hot saturated solution in water of the arsenic and blue vitriol, as described in paragraph G.

Thirdly. The combination of the process described in paragraph B, or the process described in paragraph G, with all the several steps above described, and marked with the letters A, C, D, E and F; and also the combination of either of the said processes described in section B, and section G, with any of the above named steps described in sections A, C, D, E and F.

THEO. SCHWARTZ.

No. 6328.—*Improvement in Electric Telegraphs.*

It is not deemed requisite to describe or refer to the voltaic, or any other source of electricity, nor is it intended to claim the application of that, or any other electric source to these purposes; nor is it intended to claim any of the parts employed herein, irrespective of the uses to which they are severally put, as herein described.

But I do claim as new and of my own invention, and desire to secure by letters patent of the United States,—

First. The composing of electro-telegraphic communications by making groups of perforations through paper corresponding with, or representing the signs to be transmitted, irrespective of the general arrangement of the collective or individual signs, and irrespective of the mechanical means employed to make the perforations.

Second. The application of paper, so perforated, to open and close an electric circuit, or several successive circuits, thereby transmitting the electric current or currents in successive pulsations that correspond with the perforations in the paper, substantially in the manner described and shown, but including any merely practical or convenient variations of the mechanical means or materials or fabrics employed that are analogous or equivalent in their operation and effects.

Third. The application of any suitable chemically prepared paper, without regard to the chemical ingredients used for such a purpose, to receive and record signs, forming communications, such signs being made by the pulsations of an electric current or currents transmitted from a distant station, said current operating directly, and without the intervention of any secondary current, or mechanical contrivance, through a suitable metal marking style, that is in continuous contact with the receiving paper, thereby making marks thereon, which marks correspond with the groups of perforations in the paper composing the transmitted communication, or may be given by the pulsations from the spring 45, and block 46; so that in either case these form the received communication, substantially in the manner and with the effects described and shown, including any merely practical variations analogous and equivalent in the means employed and the effects produced thereby.

ALEXANDER BAIN.

No. 6329.—*Improvement in Hooks and Eyes.*

Having now described my invention of "an improved fastening for dresses," and the mode of carrying the same into use, I wish it to be understood, that I lay no claim to the mode herein shown, of applying the hooks and eyes to garments as they may be applied by sewing if preferred, and the strips of whalebone may be dispensed with when thought desirable, but I claim the constructing of hooks with a projecting piece beyond the root of the tongue, for the purpose above explained.

HENRY McEVOY.

No. 6330.—*Improved Skate.*

What we claim as our invention and desire to secure by letters patent, is forming the upper iron part B, of the skate, with segmental spaces *d*, at the forward and heel part, and an oblong opening *e*, near the centre, and providing the same with a curved spring F, near the centre, for relieving the shank

of the foot, and an inclined curved plate G, at the heel, and rings E, and rollers H, on either side, and securing the same to the runner by dove-tailed or other formed projections *a b*, on the upper edge of said runner, entering corresponding formed slots in the upper part, and further strengthening the attachment by projections C, on the lower surface of the upper part on either side of the runner, through which and the runner bolts or rivets *g*, are inserted in such a manner as to render the skate strong and durable, and to dispense with the usual heel strap, as herein set forth.

ALEX. BARCLAY.
CH. W. BONTGEN.

No. 6331.—*Improvement in Machinery for Cleaning Hair.*

Having thus fully described our improved machine for opening and cleaning matted hair—

What we claim as our invention and desire to secure by letters patent, is the combination of a chamber in which are placed a series of elastic arms that are simultaneously made to vibrate as the disk from which they project is revolved, with another chamber in which are placed a series of tension cords that are made simultaneously to vibrate as the disks to which they are made fast are rotated; the arrangement of the two chambers and the manner of operating upon the hair, being substantially as herein represented and described.

JOHN RADEBAUGH.
JOHN A. MATLACK.

No. 6332.—*Improved Machine for making Carpenters' Squares.*

I do not claim pressing the square or rule blanks upon chisels or dies, but what I do claim as my invention and desire to secure by letters patent, is graduating squares and rules by means of an arrangement of chisels which are moveable either between or through bars, and are pressed upon the square by any known mechanical device or power, substantially in the manner herein described.

Also, I claim what is termed stamping squares, or putting on the figures by means of dies arranged as the chisels are, and acting in substantially the same manner.

JEREMIAH ESSEX.

No. 6333.—*Improvement in Apparatus for making Soda Water.*

What we claim as our invention and desire to secure by letters patent, is the employment of a perforated ball or fountain, in the manner set forth, for the purpose of making an effervescent beverage, or a drink, saturated with carbonic acid gas called soda water.

SOLOMON ANDREWS.
J. F. HALSEY.

No. 6334.—*Railway Propeller.*

What we claim as our invention and for which we desire letters patent, is the combination of the revolving disk with the legs *m n*, and straightening rods *a b*, attached to it, and the eccentric slots which are constructed in fixed pieces of metal, and act upon the rods; the whole constructed and arranged

substantially as herein described, and constituting a propeller to be attached to a locomotive.

R. G. HATFIELD.
OLIVER P. HATFIELD.

No. 6335.— *Improvement in machinery for separating Flour from Bran, &c.*

Having thus fully described our improved machine for extracting flour from bran, &c., after it has been bolted, what we claim therein as new and for which we desire to secure letters patent, is the combination of a runner, concave, and their adjustment one to the other, substantially in the manner and for the purposes above made known.

EDWIN CLARK.
JAMES M. CLARK.

No. 6336.— *Improvement in Cultivator Teeth.*

What I claim as my invention and desire to secure by letters patent, is the self-sharpening four pointed plate for a cultivator, with its iron bed, each of the four to be used successively, but when two have been used the plate is to be turned over, bottom side up, (that is, the rear made front,) in order to use the other two.

JOSEPH S. HONEY.

No. 6337.— *Improvement in machinery for taking and laying Paper from the Cutting Engine.*

What I claim as my invention, is the moveable platform, table, or sheet receptacle S, in combination with the system of endless tapes, and their supporting rollers, and applied to the paper making engine machinery, by which the sheets of paper are separated from the web thereof, and delivered to said system of tapes or endless bands and rollers, or any other equivalents therefor, or as applied to any contrivance or machine from which sheets of paper are to be received, and evenly packed or piled, as above described.

JOHN M. HOLLINGSWORTH.

No. 6338. — *Improvement in Trusses.*

Having thus fully described my improved instruments for the various kinds of hernia, and the manner of applying the same to each case, what I claim therein as new and for which I desire to secure letters patent, is an improvement upon the abdominal supporter, spring and illiptical pad, patented by me in 1835, by attaching the pads to the spring or supporter, so as to be moved into any position required, by means of adjusting screws, fissures and slides, the pad having a perpendicular motion, allowed by the fissure in the block riders, as set forth.

I also claim, in combination with the side springs, the straps to regulate the pressure, substantially as described.

I also claim the abdominal supporter boundary above the hernial pads, forming an opening between it and the lower boundary, and which is intended to sustain the abdominal viscera, and prevent its encroachment upon the internal abdominal ring.

I also claim the mode of closing the internal ring in inguinal hernia, as set

forth, by leaving the upper portion of the abdominal canal and internal ring free, as above specified.

J. W. HOOD.

No. 6339.—*Improvement in Planing Machines.*

We are aware that planing machines have been made with cutters on the face of the cutter wheel, but in such cases the face of the wheel has been, necessarily, set slightly inclined to the face of the carriage, to prevent the cutters scratching the surface, which had been already planed, and, therefore, would leave the article slightly hollowed out in the centre throughout its whole length.

And that cams have been used to regulate the cutting of cutters in machines used for various purposes. And that the cutter wheel has been so situated as to be susceptible of being slightly elevated and depressed.

And the pinions have been so arranged as to be thrown into and out of gear at pleasure. And that double levers acting on eccentric rollers have been used as binder in machinery. And that anti-friction rollers have been used to steady the board while being planed—we, therefore, claim none of these, as such, as our invention; but,

What we claim as our invention and desire to secure by letters patent, is the method of governing the sets of cutters, by the use of a cam in the central part of the cutter wheel, (whether above or below,) which will move the slides with diagonal grooves, so as to draw back the sets of cutters on one side of the cutter wheel, while those on the opposite side are cutting, that is, drawing back each set of cutters, alternately, soon after it leaves the edge of the board or other article being planed, so as to avoid scratching the planed surface as it is coming out from under the cutter wheel, while the face of the cutter wheel is parallel to the face of the carriage; and the combination of the method of shifting the cam, so as to plane equally well when the carriage is running either way, with the method of elevating and depressing the cutter wheel to conform to the thickness of the board or other material being planed; the whole constructed, arranged, combined and operating, and for the purposes substantially as herein described.

JOB SHELDON.
J. S. BARDEN.

No. 6340.—*Improvement in Tan Vats.*

I do not claim a tan vat, nor a box with perforations in the side and bottom, nor a rising and falling hide frame, nor a windlass to operate the several moveable parts of the vat; but,

What I do claim as my invention and desire to secure by letters patent, is the employment of the separate rising and falling bark chamber A, for containing the bark, in combination with the main vat F, containing the tan liquor, said moveable bark chamber A, being made, arranged and operated in the manner and for the purpose above stated.

TARLTON W. BROWN.

No. 6341.—*Improvement in Blast Generators.*

Having thus fully described my improved rotary blast generator, what I

claim as my invention and desire to secure by letters patent, is the combination and arrangement of the drum heads *a*, *b*, the valve or slip joint *j*, and the conduct, *f*, with the elbow *e*, substantially in the manner and for the purpose herein set forth.

CHARLES C. LLOYD.

No. 6342.—*Improvement in Piano Fortes.*

Having thus described my improved manner of constructing pianos, what I claim as my invention and desire to secure by letters patent, is—

First. The formation of the bottom of a piano of a metallic frame, combined with a wooden frame, or with blocks of wood, as a substitute for the ordinary piano bottom composed of united boards, for the purpose herein set forth.

Second. I claim the formation of the body or sounding portion of a piano, independently of the outside casing, by the combination of the bottom with the requisite blocks and fillings, the sounding board, the rest plank, and the top metallic frame, substantially in the manner and for the purpose herein described.

CHARLES HORST.

No. 6343.—*Improvement in Mortising Machines.*

What I claim as my invention is the afore described combination of the two chisels and mechanism for operating them, so arranged, constructed and operated as not only to cut into the wood or stile, in the manner necessary to form the mortise, but by their combined action to remove the chip or refuse wood therefrom, essentially as specified.

H. B. SMITH.

No. 6344.—*Improvement in Driving Bobbins.*

What I claim as my invention or improvement in the mode of operating bobbins, as invented by the said Francis McCully, Jr., and for which letters patent have been granted to him, and through him assigned to me, and by or through me in part, to others; I still retaining a large proprietorship or interest in the same, is the combination of the flanch *b*, the dead spindle and rotary pedestal, substantially in manner and for the purpose as above specified.

ARTHUR M. EASTMAN.

No. 6345.—*Improvement in Coffee Roasters.*

What I claim as my invention, and desire to secure by letters patent, is making the coffee toaster in a spherical form, provided with journals, in combination with a rim adapted to the form thereof, substantially as described, whereby it can be adapted to the curved boiler holes of cooking stoves, ranges, furnaces, &c., and by which also, it is adapted to the toasting of coffee more regularly than any other apparatus heretofore known.

I also claim making the spherical toaster in two parts, substantially as described, in combination with the divided journals, as described, whereby the two parts can be separated and put together without the necessity of fastenings, as described.

THOS. R. WOOD.

No. 6346.—*Improvement in the Water Ram.*

What I claim as my invention, and desire to secure by letters patent, is the peculiar combination and arrangement of the parts by which the impetus valve is made to work in a cylinder, placed for that purpose within a chamber surrounding it; said cylinder being provided with openings in its sides, which may be enlarged or decreased above the impetus valve, for the escape of the waste water, until its impetus becomes sufficient to act upon and close the valves; the whole constructed substantially in the manner and for the purpose as set forth above in my specification.

ALPHEUS D. SMITH.

No. 6347.—*Curvilinear Blind Opener and Shutter.*

Having thus fully, clearly, and exactly described the nature, construction and operation of my invention, I wish it to be distinctly understood that I do not claim opening and shutting window blinds by means of the quadrant as used in cabinet ware or otherwise; but what I do claim as of my invention, and for which I ask letters patent, is so connecting a window blind with a quadrant slide, made partly firm and unyielding, and curved to suit a quadrant casing, resting flush with the top of the window sill within the house, and partly of links, jointed to suit and attached to the blind, that by means of a handle grooved to play in a slot in the quadrant casing, and screw threaded where it passes through the slide, the blind can be thrown open and held at any angle, and forced back against the wall, the links of the slide being made to lie close to the blind at the same time that they hold it firmly to the wall by a slight retrograde movement of the handle, and screwing the handle and the slide fast to the casing, in the manner and for the purpose described.

R. B. ROLLF.

No. 6348.—*Improvement in Boxes for Railroad Cars.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the tight oil cup with the axle, so constructed that said cup shall be constantly crowded up towards its cap I, as the composition bearing box is worn by the axle S, thereby indicating the condition of said box by the space M, becoming closed.

ROBERT LIVINGTON.

No. 6349.—*Improvement in Cooking Stoves.*

Having thus fully described my improvements, what I claim therein as new, and for which I desire to secure letters patent, is first, forming a compound flue, substantially as set forth, by conveying the smoke flue around the bottom and sides of the oven, and an air flue so arranged as to convey off the surplus heat from the top of the oven to the bottom of the stove, by which the heat is concentrated there in any proportion desired. I also claim extending the air chamber up the front, where it can be used for roasting, substantially as herein described. I also claim in combination with the flue *z*, the drop damper or door *i*, in the fire chamber, to open communication with the ash pan for the purposes above designated.

B. T. RONEY.

claim as my invention and desire to secure by letters patent, is the combination and arrangement of the drum heads *a*, *b*, the valve or slip joint *j*, and the conduct, *f*, with the elbow *e*, substantially in the manner and for the purpose herein set forth.

CHARLES C. LLOYD.

No. 6342.—*Improvement in Piano Fortes.*

Having thus described my improved manner of constructing pianos, what I claim as my invention and desire to secure by letters patent, is—

First. The formation of the bottom of a piano of a metallic frame, combined with a wooden frame, or with blocks of wood, as a substitute for the ordinary piano bottom composed of united boards, for the purpose herein set forth.

Second. I claim the formation of the body or sounding portion of a piano, independently of the outside casing, by the combination of the bottom with the requisite blocks and fillings, the sounding board, the rest plank, and the top metallic frame, substantially in the manner and for the purpose herein described.

CHARLES HORST.

No. 6343.—*Improvement in Mortising Machines.*

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R. B. ROLLF.

No. 6348.—*Improvement in Boxes for Railroad Cars.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the tight oil cup with the axle, so constructed that said cup shall be constantly crowded up towards its cap I, as the composition bearing box is worn by the axle S, thereby indicating the condition of said box by the space M, becoming closed.

ROBERT LIVINGTON.

No. 6349.—*Improvement in Cooking Stoves.*

Having thus fully described my improvements, what I claim therein as new, and for which I desire to secure letters patent, is first, forming a compound flue, substantially as set forth, by conveying the smoke flue around the bottom and sides of the oven, and an air flue so arranged as to convey off the surplus heat from the top of the oven to the bottom of the stove, by which the heat is concentrated there in any proportion desired. I also claim extending the air chamber up the front, where it can be used for roasting, substantially as herein described. I also claim in combination with the flue *z*, the drop damper or door *i*, in the fire chamber, to open communication with the ash pan for the purposes above designated.

B. T. RONEY.

No. 6359.—*Improved Piston Ring, and method of deriving motion therefrom in Rotary Engines.*

What I claim as new and useful and for which I desire letters patent, is the moveable ring with cogs or teeth on its inner surface or sides, and with the incline or wedge pistons on its upper surface, and moving in the inside of the cavity or chamber of the circular ring A, as described and for the purpose set forth.

JOHN TREMPER.

No. 6360.—*Improved Tool for attaching Tubes to Boilers.*

What I claim as my invention and desire to secure by letters patent, is the combination of the guide ring, having mortises therein, with the segmental expanders and conical or pyramidical mandril, constructed and operating substantially as herein described.

Secondly. I claim, as separate and component parts of the same, the double projections on the segments, having a hollow between them, to be placed opposite to the tube sheet while the tube is being expanded within it.

Thirdly. I claim the guide ring and the mortises in the same, together with the projections on the segments to fit into them; I do not, however, confine myself to any specific number of segments, form of projection on the segments to fit into the mortise guide ring, or position of the mortise guide ring itself, which may be placed inside the tube if required; all in the manner and for the purpose substantially as herein before fully described and set forth.

THOMAS PROSSER.

No. 6361.—*Improvement in Brick Presses.*

What I claim as my invention and desire to secure by letters patent, is the mode of compressing the brick and withdrawing the same from the mould, by means of the concave space G, in the eccentric shaft F, and oblong plate E, whose end is inserted in the same, forming a cam motion somewhat similar to a toggle joint, and tangential cogs or ears H, connected together by a bolt or pin *p*, and curved cogs *m*, forming, with the movement above mentioned, a duplex motion, in combination with the radial hand lever *n*, or bar, and foot bar O, by which the operator is enabled to exert the power of his hands and feet, as herein set forth, whether the parts above mentioned be combined with the pistons and other necessary parts, and constructed substantially as those described in the specification, or any others substantially the same, by which analogous results are produced.

NATHANIEL ADAMS.

No. 6362.—*Improvement in Galvanic Batteries.*

What I claim as my invention and desire to secure by letters patent, is constructing the battery with perforated rings or bars, through which are inserted tubular or solid pins, or plates of zinc and copper, or other suitable metals, in the manner and for the purpose herein set forth, for producing voltaic electricity for medicinal and other purposes.

A. D. OLMSTEAD.

No. 6363.—*Improvement in the Divisions between the Tubes of Flexible Boats.*

I do not claim arranging or lashing together a series of inflated cylinders, composed of flexible water proof material, to form a raft or boat; neither do I claim the lashing of such cylinders around the gunwale or sides of a

boat to insure buoyancy; nor do I claim forming a boat by stretching water proof cloth or sheets of India rubber over an inflated frame resembling the ribs of such, or any attachment of such substances to a frame for these purposes; but, what I claim as new and of my own invention and desire to secure by letters patent, is making the interior divisions (*b*, *b*, and *c*, *c*,) (which to a certain extent confine the webs or water proof material forming the outer and inner surfaces of the boat,) of some elastic substance, such as sheet India rubber, to allow of the expansion of the air contained in the compartments, whenever the same shall occur from the exposure of the boat to a higher temperature than it was in at the time of its inflation; the whole construction and operation being substantially as described and set forth herein.

EBEN T. STARR.

No. 6364.—*Improvement in Shoulder Braces.*

What I claim as my invention and desire to secure by letters patent, is the back strap A A, attached to the shoulder straps B B, so as to form a continuous band to the posterior loops G G, to which the dress of the wearer is suspended behind, and the connection thereto of the posterior piece H, of the lateral pieces D D, and of the anterior pieces C C, which terminate at the loops J J, the specific action of the whole being that of a suspender combining a spinal and shoulder brace, complete in all its parts, as herein set forth.

HENRY F. BRIGGS.

No. 6365.—*Improvement in Planing Machines.*

Having thus described the construction and operation of my improved planing machine, I wish to make known that I do not claim the employment of one pair of feed rollers; nor the employment of feed rollers, nor stationary planes in themselves, nor a bed composed of alternate friction rollers and flat bars, when the rollers are made yielding by springs or otherwise, as these things have before been used by others; but, what I do claim as of my invention and which I desire to secure by letters patent, is—

First. The combination of the non-elastic mouth piece *w*, with the upper feed rollers H, G, it being attached to the frame in which they are mounted, and by which its position is so governed that it accommodates itself to the surface and thickness of the first shaving cut off the board, substantially in the manner herein set forth.

Second. I claim the combination of the series of stationary planes M, with the bed B, composed of alternate unyielding anti-friction rollers *o*, and flat cross bars *o'*, the axes of the rollers being in the same vertical plane with the edges of the irons, so that their periphery may afford a constant support to one side of the board, directly opposite to the point at which the iron is cutting the other, whereby the surface of the board, especially when it is thin, is rendered smoother and its thickness more uniform than if it were not thus firmly supported.

ENOS G. ALLEN.

No. 6366.—*Improvement in machinery for separating Flour from Bran.*

I do not claim to be the original inventor of an upright bran sifter, but what I do claim as my invention and desire to secure by letters patent, is—

First. The employment of the angular reflecting bars E^2, formed on a portion of the concave surface of the vibrating sifting cylinder E^1, in combination with the radial wings *q*, on the surface of the upper portion of the

close cylinder, when said cylinder is composed in part with the bristle or other brushes, said angular reflectors being thus arranged for the purpose of repeating the reflection of the bran against the radial wings *q*, of the cylinder, as often as the revolving cylinder throws it against the ribbed portion of the vibrating cylinder or concave, and thus detaching the flour from the bran before it comes in contact with the brushes to be driven through the wire cloth, as above described.

Second. I also claim the employment of the gravitating hammers or beaters V, for the purpose of beating or detaching the flour from the meshes of the wire cloth, in combination with the pistons S, and cam wheel Y, springs K, and reticulated cylinder E, whether arranged in the manner described, or in any other mode, which is substantially the same, the vibrating or flexible cylinder being arranged on the springs K, so as to yield to the stroke of the gravitating hammers, and thereby facilitating the discharge of the flour from the meshes of the wire cloth screen, as described.

JOSEPH JOHNSTON.

No. 6367.—*Arrangement of Flues in Marine Boilers.*

Having thus fully described my improvements, what I claim therein as new, and for which I desire to secure letters patent, is constructing the boiler substantially in the manner above described, by the employment of a series of central and side water tables, forming a flue in which the gases are alternately divided and commingled in the manner and for the purpose set forth.

R. F. LOPER.

No. 6368.—*Improvement in Water Rams.*

Having thus fully described the nature of my improvements in the hydraulic ram, what I claim as my invention, and desire to secure by letters patent, is the conducting the water from the spring or fountain head to the ram, through a cluster of small tubes (*e e*,) combined with the pipe A, that forms the body of the ram, substantially in the manner and for the purpose set forth.

JOSHUA L. GATCHEL.

No. 6369.—*Improvement in Spectacle Glasses.*

What we claim as our invention, and desire to secure by letters patent, is constructing glasses for spectacles in such a manner that the upper portion of each glass is adapted to seeing distant objects, and the lower portion to seeing objects near the eye, the two portions being in one piece, substantially as above set forth.

DAVID HOTCHKISS.
BENJAMIN W. NORTON.

No. 6370.—*Improvement in Cutters for Tongueing and Grooving.*

I do not claim the forming of cutters by turning the reverse section of the work, on the periphery of rings or segments of rings, nor do I claim the mere arrangement of a series of cutters in the same cutter head, these methods being already known; but what I do claim as my invention and desire to secure by letters patent, is making revolving cutters in the form of segments of circular rings, of less diameter than the cutter heads, and arranging and securing them in circular grooves, which at the parts where the cutting edges project, are tangential, or nearly so, to the circles described by the edges of the cutters, in such manner that slight inaccuracies in adjustment will make no

perceptible difference in the operation of the cutters, and whereby the great loss of time and expenditure of labor now usually employed in adjusting revolving cutters for similar purposes are avoided, substantially as herein set forth.

HAZARD KNOWLES.

No. 6371.— *Improvement in Machinery for Breaking and Dressing Hemp.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the rotating beaters, in combination with the arrangement of the two breaking rollers which reverse the hemp or flax, that both sides may be acted on in succession, and which constitute moving rests, to sustain and move the hemp or flax while acted upon by the rotating beaters, substantially as described.

ALLEN ELDRED.

No. 6372.— *Improvement which consists in producing a Substitute for Wool from Jute.*

Having thus fully described the nature of said De Villeneuve's invention or discovery, what is claimed therein, and desired to be secured by letters patent to William O'Connor, administrator, &c., is the producing of a material which may be substituted for animal wool, by taking that species of hemp called jute or Calcutta hemp, and reducing it into fine fibres, capable of being spun into yarn or thread of various degrees of fineness, by stamping, combing, and otherwise treating it, substantially in the manner herein set forth. It is not sought to claim either of the individual processes herein described as of said De Villeneuve's invention, but it is sought to claim him to have produced by their combined operation, from a material hitherto of little value, a fibrous substance of great utility, and not hitherto known in the arts.

WILLIAM O'CONNOR.

Administrator to Estate, &c., of late Henri Meneau De Villeneuve.

No. 6373. — *Improvement in Tanning by Electricity.*

What I claim as new and of my own invention, discovery or improvement, and desire to secure by letters patent, is the application of a circulation of the electric fluid, supplied from any competent source of electricity, to accelerate the process of liming and cleaning hides and skins, and also the application of a like circulation of the electric fluid to accelerate the process of tanning hides of any description, with any proper tanning material or materials in solution, wholly irrespective of the description of hides or skins, and irrespective of the tanning substances employed, substantially as herein described and shown.

EPIDAURUS IRVING.

No. 6374.—*Improvements in Machinery for boring Bobbins.*

I do not claim any of the parts of this machine, except in their application to said machine; but what I do claim as new and of my invention, and desire to secure by letters patent, is first, the combination and arrangement of the cam wheel *j*, hinged vibratory board *h*, connecting arms *g g*, carriage *e*, and cord *l*, weight *k*, notched bar *u*, trigger *w*, and stop A, for imparting to the spool to be bored, a horizontal reciprocatory motion to and from the boring instrument, and for arresting the motion of the carriage at successive intervals, in the manner and for the purpose herein set forth.

CURTIS E. NORRIS.

No. 6375.—*Improvement in Fan Rocking Chairs.*

Having thus fully described my improved attachment, what I claim therein as new and desire to secure by letters patent, is combining with a rocking chair, a curtain suspended upon a frame affixed to the back of the rocking chair and having a weight or weights attached to its lower edge, in the manner and for the purpose above described.

MARY ANN WOODWARD.

No. 6376.—*Removable Fire Box for Locomotives.*

Having thus described the improved arrangement of my boiler and fire-box, I wish it to be understood that I do not claim to be the inventor of the fire-box made separate from the boiler and dome, and afterwards unremovably attached thereto, when set in place to generate steam for motive power; but what I do claim as my invention and improvement, and desire to secure by letters patent, is, attaching an independent fire-box to the steam boiler in such a manner as to render it easily removable, without displacing the boiler dome, machinery, or frame-work, for the purpose of being repaired or replaced by another, whether the means of attachment be those herein described, or others capable of effecting the same object, and which have been used for analogous purposes.

I do not claim making the dome to project from the end of the boiler, over the fire box; but when it does so project, I claim making it with a fixed and tight bottom sufficiently strong to resist the pressure of the steam, in order that it may be unnecessary to rivet it to the fire box, as has heretofore been the practice, and that one or more pipes arranged so as to be easily detached and of sufficient capacity to allow the free passage of the steam generated in the casing of the fire box, may be all the connection that is necessary between the latter and the dome.

JOHN P. DE HAVEN.

No. 6377.—*Improved Forks for holding Rope Belts upon Drum Wheels.*

What I claim and desire to secure by letters patent, is the manner above described of preventing the slipping of ropes upon wheels, viz: by attaching grippers or clamps to the periphery of the wheel, which are made to grasp and hold the rope by its own weight and the draft, the whole operating substantially in the manner and for the purpose set forth.

CHARLES FOSTER.

No. 6378.—*Improvements in Cotton Gins.*

Having thus fully described my improvement in the roller cotton gin, what I claim as my invention and desire to secure by letters patent, is the combination of series of ribs (F S,) and lateral adjustable bearing supports *t t*, with the ginning rollers, substantially in the manner and for the purpose herein set forth.

MALCOM McAULAY.

No. 6379.—*Improvement in Cotton Scrapers.*

What I claim as my invention is the peculiar connection and arrangement of the slide H, landside K, and mould-board No. 1, as described, securing the proper position of the scraper, regulating the position of the stock, and preventing the alteration of its set by the wear from friction to which the unprotected helve is subject.

WILLIAM C. FINNEY.

No. 6380.—*Improvement in Saw Mills, with Cylindrical Saws.*

What I claim as my invention and desire to secure by letters patent, is the forming of the carriage ways of a cylindrical saw mill, with arrangements for laterally inclining their position, with reference to the axis of the saw barrel, for the purpose of preventing the friction of timber against the outside of the barrel, substantially as herein described.

I also claim the moveable dog, sliding on a support in the interior of a saw barrel, in a groove inclined towards the axis thereof, and acting to keep the end of the piece of stuff which has been cut slightly bent as it advances, and out of contact, and consequently free from friction against the interior surface of the barrel, whereby I am enabled to use a saw barrel of increasing thickness from the cutting towards the supporting end of said barrel, in the manner and for the purposes herein set forth.

I also claim the combining of one or more inside with four or more outside cylindrical revolving guides, all capable of sliding longitudinally on their respective axes, so as to accommodate their positions to the gradual wearing away of the saw, and acting to prevent changes in its cylindrical form while undergoing rapid revolution. GILBERT HATHEWAY.

No. 6381.—*Improvement in Shoe Lasts.*

What I claim as my invention and desire to secure by letters patent, is the employment of the extra screw No. 1, for expanding the uppers over the ball of the foot, in the manner and for the purpose herein described and represented. JOHN WHISTLER.

No. 6382.—*Improvement in Corn Shellers.*

What I claim as my invention and desire to secure by letters patent, is the combination of the adjustable toothed shelling plates (*m*,) with the fixed bars or segments (*i*,) to form a toothed concave, within which a spiked, fluted or roughened cylinder revolves, for the purpose of shelling corn, the whole being arranged and operated in the manner herein set forth.

ISRAEL KEPLER.

No. 6383.—*Improvement in Machines for Polishing Stone.*

Having thus fully described the nature, operation and construction of my self-shifting stone rubbing machine, what I claim therein as new and desire to secure by letters patent, is the combination of a fixed bed and toothed wheel with a rotating frame, constructed and arranged as herein described, so that the pinions driving the rubber carriages radially therein, shall cause them to pass over a different track with regard to themselves and each other consecutively, the teeth on the fixed wheel not being a multiple of the teeth on any one of the pinions, whether the pinions are of equal or unequal diameter the one to the other. GEORGE FLETCHER, Sr.

No. 6384.—*Filtering Apparatus for Steamboat Boilers.*

What I claim as my invention and desire to secure by letters patent, is placing a boiler filter near or upon the bottom of a vessel, with a pump elevating the water from its upper surface, when the reservoir beneath the filter is connected with the outside water by means of two inclined apertures, with stops or valves for closing them, constructed substantially as herein described,

whereby the greatest amount of pressure may be exerted upon the filtering diaphragm, and it may be washed by a current produced by the motion of the boat, substantially as herein described. P. K. HUBBS.

No. 6385.—*Improvement in Obstetrical Supporters.*

Now what we claim as our invention, and desire to secure by letters patent, is the combination and arrangement as described, of the pads, straps and handles which make up the above described instrument denominated an obstetrical supporter, whether the said instrument be constructed in the manner above described, or in any other mode substantially the same, by which analogous results shall be produced, as set forth.

ABIATHAR POLLARD.
SIMEON MINKLER.

No. 6386.—*Improvement in Bedsteads.*

I lay no claim to a combination of rest bars or boards, spiral or wound wire springs, a sacking and enclosing frame used to support a cushion or mattress, such a combination having been employed in the manufacture of sofas and various other articles of furniture; but what I do claim as my invention, is the above described manner in which I construct the foundation or support of the mattress or bed, for the purpose of making the bedstead portable and easily set up or put together, or taken apart, as circumstances may require; that is to say, I claim the combination of the two frames or halves of a box, (each of said frames consisting of a side, two ends, and bottom or slats) the two sackings (each affixed to its frame at one side and two ends, and supported on springs or stuffing, as occasion may require,) the clamps and keys or wedges (for connecting the two frames) and the lacing holes, and lacing extending *through the middle* of the mattress foundation, meaning in the above to lay no claim to either of the elements of said combination, when separated from the rest, but intending only to claim the whole as a combination constituting a bedstead support, for a mattress or bed, and to which the posts are to be applied, substantially as above specified.

NATHL. COLVER.

No. 6387.—*Improvement in Machinery for Cutting Screws on Rails for Bedsteads.*

What we claim as our invention, and desire to secure by letters patent, is the combination of the simultaneous adjuster and graduater L J J, with the headstocks C C, the semicircular female governors G G, and V, or other formed bitts or cutters, substantially as above described, through the medium of which a *perfect simultaneous* movement of the bitts is produced in adjusting their relative distances as regards the shoulders of the rail, and in cutting the screws, and also a simultaneous and equal adjustment of the headstocks.

WILLIAM F. CONVERSE.
JONATHAN BURDGE.

No. 6388.—*Improvement in Machinery for Spinning Hemp, &c.*

Having thus set forth my improvements, I shall claim as my invention *the permanent clearer* and presser, in combination with the gill, operating substantially in the manner herein described.

WM. C. HIBBARD.

No. 6389.— *Improvement in Churns.*

Having thus described the construction and operation of my improved churn, what I claim as my invention and desire to secure by letters patent, is the method of exposing the cream thoroughly to the action of the atmosphere, and separating the butter therefrom at the same time, as soon as formed, by means of the air tubes and strainer, in combination with the dasher, arranged substantially as herein set forth.

SAMUEL HUFF.

No. 6390. —*Improvement in Frame for Musqueto Bars.*

What I claim herein as new, and desire to secure by letters patent, is the arrangement of rods and springs after the manner or principle substantially as herein represented, by which a tester frame or musqueto bar may be either erected or folded out of the way at pleasure.

L. AIMABLE PROSPER JACQUES.

No. 6391. — *Improvements in cutting out Cylinders for Bobbins, &c.*

What I claim is the combination of one or more passages e, with the inner part of the cylinder A, and discharging space or spaces between the ribs, in order to admit of the discharge of the chips or borings of the centre bitt, as specified.

LEWIS BROWN.

No. 6392.—*Improvement in Planing Machines.*

What we claim as our invention, and desire to secure by letters patent, is the feeding the boards or plank into the machine, and retaining them in a stationary position whilst they are operated upon by the series of planing, tongueing, and grooving cutters in the reciprocating frame, by means of the pressure rollers (A B,) which are so combined with the reciprocating frame, and with suitable retaining clicks and ratchet wheels, that the rollers will be rotated during the backward movement of the reciprocating frame, and retained in a stationary position during the forward movement of the same, substantially as herein set forth.

CHARLES H. PECK.

his

COLEMAN + HICKS.

mark.

No. 6393.—*Improvement in Portable Beer Fountains.*

What I claim as my invention, and desire to secure by letters patent, is a portable fountain, in form and arrangement as herein described, that is to say, the combining therewith, a refrigerator and a gas receiver, to prevent explosions, and retain and preserve beer and other fermented and gaseous liquors, in the manner and for the purposes set forth.

DAVID GAY.

No. 6394.—*Improved method of Fastening Railroad Switches.*

What I claim as my invention, and desire to secure by letters patent, is fastening a railroad switch lever into its place, by means of arcs with slots or notches in them, attached to the lower part of the stand, into which slots a bolt drops, which bolt passes through an elongated hole in the lower part of the lever. I also claim locking the said bolt fast to the main lever, substantially in the manner and for the purpose herein described.

FRANCIS G. WOODWARD.

No. 6395.—*Improvement in Boiling Sugar.*

I am aware that pipes or tubes have been passed through the syrup for the purpose of heating the syrup with the *steam*, and that pipes or tubes are used in locomotive boilers as flues to pass the heated air, smoke, &c., through the water in the boiler for the purpose of economizing the heat, and that several boiling pans have been heated by one and the same fire; I therefore claim none of these, as such, as my invention; but what I do claim as my invention and desire to secure by letters patent, is the combination of the boiling pans H H′ H″, of this construction, with the pipes or tubes J J J, passing through the whole length of the series of boiling pans, and with the several dampers *g c b b′ a* & *a′*, to direct, vary and change the direction of the heat, and with the clarifying pans G′ & G′, so set as to be heated by the same fire which heats the boiling pans, and yet so that the heat may be entirely shut from the clarifying pans, or either of them, at pleasure; the whole constructed, arranged, combined, and for the purposes substantially as herein described.

KNIGHT REED

No. 6396.—*Improved Variable Power Capstan.*

What I claim as my invention and desire to have secured to me by letters patent, is a capstan constructed as herein above specified, so as to be susceptible of producing a quick and direct action, to overcome a slight resistance, and a slow and more powerful action to overcome a great resistance by merely turning the drum-head round in the opposite directions, while the barrel of the capstan always moves in the same direction, and the same being accomplished without any shipping or unshipping of gears, and by a system of ratchets, pawls and gear wheels, pinions, &c., all arranged so as to turn with the capstan for the direct and quick action; but for the slow and more powerful action, to turn the capstan barrel in the same direction, by reversing the motion of the drum-head; said parts being combined and operating substantially as herein above set forth.

JOSEPH E. ANDREWS.

No. 6397.—*Improvements in Diving Bells.*

What I claim as my invention and desire to secure by letters patent, is—

First. The stationary mode of descent by slides Z, attached to the canopy 21, corresponding in length to the depth of water, and which slides Z, pass through long upright grooves H and H², attached to the scows E, the slides Z, and canopy 21, attached, being forced down together by the rack and pinion I, or other mechanical equivalents, the whole constructed substantially as herein described.

Secondly. The mode of supplying and using the light, by a lamp *t*, secured to the sides of the canopy 21, having a chimney *m*, passing out from the top, and a tube *r*, and stop cock *s*, from the inside, to admit a current of air of sufficient volume to sustain the lamp *t*, with two glasses, one V, of which throws the light inside, and the other * * out; the oil being kept in sufficient quantity in a holder *o*, on the inside suspended under a vacuum, and regulated by a stop cock P.

Thirdly. For the novel mode of communication through a tube 11, reaching to the top of the slides, with the mouth pieces 22, and stop cocks 24, attached.

J. RUTHERFORD WORSTER.

No. 6398.—*Improvement in Machinery for Sawing Wood.*

Having thus described the construction and operation of my improved sawing machine, what I claim therein as new and desire to secure by letters patent, is the combination of the turning arms (*m*,) with the press beam (*g*,) ratchet wheel (*p*,) reaching arm (*r*,) and lever (*s*,) for the purpose of raising, holding and feeding the wood to be sawed, substantially as herein set forth.

JOSEPH M. TOY.

No. 6399.—*Improvement in Machines for making Grind Stones.*

Having thus described my invention and improvement, what I claim therein as new and desire to secure by letters patent, is the combination of the apparatus for regulating the supply of sand and water, with the boring cylinders, whether the several parts be made and arranged as herein described, or in any other substantially the same manner.

COTTON FOSS.

No. 6400.—*Improvement in Bellows.*

What I claim and wish to secure by letters patent, is a double acting vertical bellows, acting on the air by a centre moveable board, forcing it alternately each way through valves, and receiving wind through it at the same time, as herein described, using any combination of moveable boards and arrangement of valves which will produce the desired effect.

WILLIAM T. BARNES.

No. 6401.—*Locomotive with driving Axle above the Boiler.*

What I claim is the above described mode of arranging the boiler, the axle of the driving wheels, and truck frames of the supporting wheels, whereby I am enabled to produce an engine combining great speed and safety.

R. H. EMERSON.

No. 6402.—*Improvement in Tables for Ship's Cabins.*

The principal feature of my invention and that claimed by me, is the above described peculiar arrangement of, or manner of arranging the hinges or rocking or turning bearings of the table top, together with that of applying the pendulum apparatus by which the level of the top board is preserved under the transverse motions of the vessel; the said arrangement consisting—

First. In placing the hinges or turning bearings nearer to that edge of a table at which a person is to sit than to the opposite edge, substantially as shown in the drawings.

Second. In applying the pendulum apparatus to the opposite side or part of the table, essentially as described, whereby it is caused, when the pendulum is vibrated, to act against or raise and depress and give greater motion to that side or part of the table top which is opposite to that at which the person sits; the effect of said arrangement, when a vessel is in the act of rolling, being not only to render the table free from inconvenient motion where a person sits to it, but to impart to it stability under weight or pressure applied to it near the edge at which the person so sits or is placed. And I also claim the above described mode of making a table, viz: a combination of two top boards B, B′, a supporting frame, and one or more sets of pendulum apparatus, whether made and applied as exhibited in figures 1,

2, 3 and 4, or as represented in figure 5, and as above explained; the whole being constructed so as to operate essentially as above specified.

WILLIAM N. BOGGS.

No. 6403.—*Improvement in Calculating Machines.*

What I claim and desire to secure by letters patent, is the combination of the stationary circle A, figure 1, with the circles C and D, figure 1, and with circles O and 6, figure 2, in the manner and for the purpose substantially as described. I also claim the combination of the inner circle C, figure 1, with the ratched circle *b*, figure 2, in such a manner as to move circle 6, figure 2, one number in one direction for every revolution of circle C, in a contrary direction, for the purpose of carrying one to the outer square hole F, for every hundred added by moving circle C. I also claim the combination of the pinion 8, with the moveable circle D, and the roller 9, screw 10, and wheel *y*, and the bevel 7, whereby when the circle D, is moved round, the roller 9, and the minor circle plate of E, are moved also in conjunction with the circle C, for the purposes herein set forth.

I do not claim the particular mechanical devices in this machine, such as a bevel plain to turn a pinion, and a screw to move a wheel, as all these have been long known, but I claim the combination, in the manner specified in the above claims, of the mechanical devices, or their equivalents, herein set forth, along with the circles and circle stationary, and fixed, having figures on the same, to produce the arithmetical results, substantially as herein described.

WILLIAM M. HAINES.

No. 6404.—*Improvement in printing Paper Hangings.*

What we claim as our invention, is the combination of the platens with the block frames, by means of the coiled springs, to keep up the blocks from the face of the table, and to allow the said blocks to be pressed down on the paper and color-seives, substantially as described.

We also claim the arrangement of the cams on the revolving shaft, in combination with the spring pistons in the guide eyes *o*, *o*, *o*, to press down the platens during the intermission of the motion of the block frames, substantially as described.

We also claim the combination of the catch bars J^1, J^2, with the rocker L, and the connecting rod V, and oscillating angular lever M, and the arm N, connected with the block frame, to take the printed paper from under the block, and bring forward the unprinted paper to receive the next impression, substantially as described.

W. M. SHAW.
EZRA GOULD.

No. 6405.—*Improvement in Trusses.*

What I claim as my invention and desire to secure by letters patent, is the mode of applying a truss or supporter, constructed substantially as herein described; and I also claim making the metallic or spring portion of the truss or supporter, to be applied perpendicularly between the legs of round or oval wire, in the manner and for the purpose herein described.

ABIJAH SMITH.

No. 6406.—*Improvement in Artificial Teeth.*

What I claim as my invention and desire to secure by letters patent, is making or preparing the tooth with an aperture passing through it, and terminating with a counter sink or suitable bearing, to receive or support the head of the screw, as herein set forth, as a new article of manufacture.

HENRY LAURENCE.

No. 6407.—*Improvement in Education Tables.*

Having now described my invention, I will proceed to state what I claim and desire to secure by letters patent—What I claim as my invention, is the manner in which I make my education tables, substantially as set forth, of two sets or series of grooves, one for the fount, the other for the operations of calculation, in combination with sliding types, the grooves and types so constructed as to prevent the types from being lifted or falling out, and the grooves so arranged that the types may pass by each other, as set forth.

EDWIN ALLEN.

No. 6408.—*Self-regulating Filtering Diaphragm.*

What I claim therefore as my invention and desire to secure by letters patent, is the combination of a filtering diaphragm, composed of elastic media and moveable disks, substantially as herein described, when combined with an outer shell or case within which it can rotate, either to force the liquid to pass through the filtering medium, or to pass by the side thereof, and issue without being filtered, the stem or journal of the diaphragm being passed through a stuffing box attached to the outer case, as herein described, or in any other manner essentially the same.

I also claim making the filtering medium with one or both perforated disks, moveable, as herein described, when combined with an elastic filtering medium, substantially as described.

WILLIAM H. JENNISON.

No. 6409.—*Improved Right or Left Hand Lock.*

What we claim as our invention and desire to secure by letters patent, is the constructing a door lock in such a manner as to allow of its being used equally well on a door opening either to the right or to the left hand, by means of a key hole that will admit a key within the lock in reversed positions, in combination with such an arrangement of the movements of the lock as will enable the key to operate the same tumbler and bolt, in whichever position it may be inserted within the key hole.

L. R. LIVINGSTON.
JOHN J. ROGGEN.
CALVIN ADAMS.

No. 6410.—*Improved Gold Washer.*

What I claim as my invention and desire to secure by letters patent, is the employment of a chamber or tube through which a current of water is to flow, when this is combined with a second tube or chamber, which receives the gold and earthy matter, and the third or outer chamber provided with a bottom so far below the partitions forming the first and second tubes or chambers as to leave a space for the passage of water from the first tube or

chamber to the discharge chamber or outer casing, substantially in the manner and for the purpose specified.

L. JENNINGS.

No. 6411. — *Improvement in Churn Dashers.*

Having thus fully described my improved dasher, what I claim therein as new, and for which I desire to secure letters patent, is the above described dasher, made concave, with openings around it for dispersing air throughout the cream without the use of valves, constructed and arranged substantially in the manner set forth.

JOSIAH A. GRIDLEY.

No. 6412. — *Improvement in Machinery for making Mats, &c.*

Having described our invention and the best manner known to us of manufacturing the same, likewise the manner of making the fabric; we do not claim the invention of fabrics whose body and nap are held together by means of cement or glue, as this has been made before, by drawing the threads through openings in plates of metal and wire cloth; nor do we claim the invention of the cylinders nor the graduating screw, nor the hooks used in making our machine; but what we do claim as our invention, and desire to secure by letters patent, is a comb composed of a series of divisions or cells, either entirely separated or otherwise, in combination with the pistons and graduating screws, in manner and for the purpose substantially as is above described.

DANIEL HODGMAN.
A. D. WYCKOFF.

No. 6413. — *Improved method of making wire-strengthened Spoons.*

What I claim as my invention and desire to secure by letters patent, is the mode herein described of making spoons by first casting them upon a draw tap, with the ends of the spoon handles larger than ordinary, and then having inserted a wire, swedging the handles to the required and proper shape, completely covering and concealing the inserted wire.

WILLIAM MIX.

No. 6414. — *Improvement in Valve Seats, &c., for Water Mains.*

Having thus fully described the nature, construction and operation of my invention, I wish it distinctly understood that I do not claim separately, any of the parts involved in this combination; but what I do claim and desire to secure by letters patent, is arranging and combining substantially as described and represented, or in any analogous manner, the several parts involved in the construction of stop valves for water mains, viz: the chamber (*a*,) the moveable pipe heads (*b*,) the valve seats (*c*,) the system of lugs, bolts and screw nuts (*q*,) the soft metal (*z*,) and the valve (*d*,) so that buried as they must be, beneath the frost line in the ground, they can be adjusted in the matter of their valves and valve seats, without being removed from their permanent location in the line of the water main.

T. R. SCOWDEN.

No. 6415. — *Improvement in Cast Iron Car Wheels.*

What I claim as my invention, and desire to secure by letters patent, is casting railroad car wheels with a rim C, of the form of a semi-elipsis, and of an oblate spheroid B, near the centre, the hub A, being cast solid with the

same, with braces D, of the form of cyma-reversa, and cyma-rectas formed in the valley between the rim and oblate spheroidal shell surrounding the hub, arranged in contrary directions on either side, in the manner and for the purpose herein set forth.

ISAAC VANKURAN.

No. 6416. — *Improvement in Easy Chairs.*

Having now described my improvement in making easy chairs for the sick room, I will proceed to state what I claim and desire to secure by letters patent. What I claim therefore, is the employment of the sliding seat board D, draw slide F, for covering the mouth of the chamber box, and the sliding chamber box H in combination with, and as adapted to an "easy, or sick room chair," so as to make a portable close chambered easy chair for the sick room, in form and manner substantially as herein described.

AUGUSTUS CLARKE.

No. 6417. — *Improved method of turning the Drill in Rock Drilling Machines.*

We claim the combination of the slotted plate, and the friction clasp and its arm, as applied to the drill shaft and main frame, and made to operate in connection with the elevating jaws *c c*, substantially in the manner and for the purpose of rotating the drill, as specified.

JESSE N. BOLLES.
HENRY G. KNIGHTS.

No. 6418. — *Improvement in the preparation of Flour for Bread Making.*

I do not claim mixing acid and alkali with flour, as a substitute for yeast, nor do I claim mixing one of these ingredients with flour in the dry state, when the other is dissolved for making bread; but what I do claim, is mixing both the acid and alkali with the flour in the dry state, sugar and salt being added or not, at will, substantially in the manner and for the purpose herein set forth, as a new article of manufacture.

HENRY JONES.

No. 6419. — *Improvements for Jointing and Cutting Staves.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the main (stave cutting) knife C, with the two jointing knives, and with feeding apparatus, in such a manner that the staves will be jointed immediately before they are cut from the block, and then the block moved forward in the proper position, to be again acted upon by the jointing and stave cutting knives, substantially in the manner herein set forth.

CHARLES MOWRY.

No. 6420. — *Improvement in Electric Telegraphs.*

What I claim as of my own invention and improvement, and desire to secure by letters patent, is—

First. The use of a *single circuit* of conductors for the marking of my telegraphic signs, already patented for numerals, letters, words or sentences, by means of the decomposing, coloring or bleaching effects of electricity acting upon any known salts, that leave a mark as the result of the said decomposition, upon paper, *cloth, metals or other* convenient and known markable material.

Second. I also claim the combination of machinery as herein substantially described, by which any two metallic points or other known conducting substance, broken parts of an electric or galvanic circuit, having the chemically prepared material in contact with and between them, may be used for the purpose of marking my telegraphic characters already patented in letters patent, dated 20th June, 1840, in the first re-issue 15th January, 1846, and second re-issue 13th June, 1848. SAMUEL F. B. MORSE.

No. 6421.—*Improvement in Corn Shellers.*

Having thus fully shown and specifically described the nature and kind of our several improvements in the construction of the machine for shelling corn, and fully and specifically described the several operations of the said several improvements; now what we claim therein as new and desire to secure by letters patent, are —

First. The manner in which we cut out, and bevel off, the spaces between the teeth of the driving wheel and pinion, as represented in figs. 1, 2 and 6, at the points *a a a*, so as to present a sharp edge instead of a plane surface or bed between the teeth.

Second. We claim the combination of the toothed wheel seen in fig. 1, with the bevelled or curved cylinder seen in fig. 3, arranged in the manner and for the purpose described; which said improvements being so made are to operate in the manner and for the purposes herein before more fully and specifically set forth. We do not claim any other part of the within described machine or apparatus as our invention.

EZRA WHITMAN.
DAVID O. PROUTY.

No. 6422. — *Improvement in Sausage Machines.*

What I claim in the foregoing as my invention and desire to secure by letters patent, is the nozzle for stuffing the sausages, in combination with the hollow and solid conoids for grinding or mincing the meat, whether the same are arranged as herein described, or in any other substantially similar manner, by which the processes of stuffing and grinding can be simultaneously performed at one operation. THOMAS LOCKETT.

No. 6423.—*Improvement in Broom Brushes.*

What I claim as my improvement and discovery and desire to secure by letters patent, is the application and adaptation of the branches of the cabbage palmetto tree to the manufacture of brooms and brushes, (the handles being a portion of the same,) as described.

AGDALENA S. GOODMAN.

No. 6424.—*Improvement in Spring Rake Teeth.*

I lay no claim to the mode of applying each of the teeth to the beam or head of a rake, viz: by the joint, spring and staple, in combination with each other and acting together, as specified in the patent of Seneca Ladd; but what I do claim as my invention, is my improved mode of applying each tooth to the rake-head; that is, I claim the combination of the spring *socket*, spring and tooth, as arranged, constructed and applied together and to the rake-head, substantially as specified. LYMAN BAKER.

No. 6425. — *Improvement in Trusses.*

What I claim as my invention and desire to secure by letters patent, is two rods of metal of a proper size and shape, figure 1, letters *a*, *b*, and meeting under the pereneum, when in use, in combination with the metallic spiral spring or springs, or other analogous device.

LEWIS A. HALL, Physician.

No. 6426. — *Improvement in Washing Machines.*

Having thus described the construction of our improved washing machine, and the manner in which it operates, what we claim therein as new and desire to secure by letters patent, is —

First. The combination of the lever H, alternating rod *f*, and jointed rods *i*, with the dashers and wash boxes *b* & *c*, whereby two different lots of clothes, in two distinct wash boxes, may be cleansed at the same time by the action of two separate dashers operated by one lever.

Second. We claim the combination of the wells and plungers with the wash boxes, substantially in the manner and for the purpose described.

SYLVESTER MUNSON.
WM. H. PRATT.

No. 6427.—*Improved Self-acting Railroad Switch.*

What I claim as my invention and desire to secure by letters patent, is the combination and arrangement of the traversing bar or lever D, horizontal connecting rods E, oblong plates *h c*, containing straight and oblique slots *g d*, in which the pin or cog F, rising from the connecting rod E', next the main track moves; transverse curved bar *b*, secured to the oblong plate *c*, containing the oblique slot, and to the vibrating ends of the switch, vibrating plates *f*, having cogs H', projecting from the upper parts, levers G, and springs H, and horizontal bar I, on the locomotive, operated as before stated, for moving the ends of the switch either next the end of the rails of the main track, or turn out track, at the option of the engineer, or other person to whom the duty is assigned, substantially as herein set forth.

LUCIUS B. WOODS.

No. 6428.—*Improved Lugs and Links for connecting Pipes.*

I do not claim as my invention the horns or lugs, and links or hasps, simply to hold the ends of the pipe together, as they have been used before; but I claim the hooked form of the horns B B, and the wedgelike form of the horns C C, by which the links or hasps D, when applied to the said horns are made to perform in a speedy and cheap way the work of screw bolts in making a tight joint, substantially as above described. For this I desire letters patent.

CHAPMAN WARNER.

No. 6429. — *Method of operating Railway Switches.*

What I claim as my invention and desire to secure by letters patent, is the arrangement and combination of the notched lever D G, slotted sliding plates F, blocks or keys (*d*,) attached to the levers G, by the pins H, and chains I J, pulleys (*e f*,) and weights *g*, operated by a cam or projection on the under part of the locomotive, in the manner and for the purpose herein set forth.

W. C. HICKS.

No. 6430.—*Improvement in Brewing and Preserving Alcoholic Drinks.*

What I claim as my discovery and desire to secure by letters patent, is the preparation and employment of oak or other woods possessing similar chemical properties, or an extract of such woods, substantially as herein described, as a substitute for hops in brewing, distilling and yeast making, to refine and improve the flavor of spirituous liquors, as a counteractive of acetous fermentation generally in wines and other fermented liquors, in syrups, vegetable extracts and other unfermented liquids, and to correct and improve the flavor of stale wines, cider or beer. JOHN HOPKINS.

No. 6431.—*Improvement in Daguerreotype Apparatus for Gilding Plates.*

We do not claim to have invented any of the parts used herein, as all are well known; but what we do claim as new, and of our own invention, and desire to secure by letters patent of the United States, is the application of the frame *c*, constructed with points 8 and 9, to carry the plate supported by a moveable standard *a*, on a triangular bed *a*, having screws 1 1, for the purpose of adjusting the frame *c*, and daguerreotype plate to a level, while "gilding" or otherwise operating on the same, substantially as described and shown. WILLIAM LEWIS.
W. H. LEWIS.

No. 6432.—*Improvement in Saw Mills.*

What I claim as my invention and desire to secure by letters patent, is the means above described, to preserve, increase and regulate the tension of the working portion of the saw, when at work, viz: the application of the driving power to the lower pulley *b*, when the saw is designed to work in its downward motion, and the application of the break *z*, to the upper pulley *a*.
LEMUEL HEDGE.

No. 6433.—*Improvement in Bedsteads for Invalids and others.*

What I claim as my invention, and desire to secure by letters patent, is first, the setting of the posts B, in such a manner as to admit of the swinging of the suspended frame K, either lengthwise or crosswise of the bed.

Second. I claim guide board *m m m m*, worked by straps or otherwise, for giving direction to the motion of the suspended frame.

Third. I claim the application of the springs to support the guide boards in their places during the operation of swinging.
FRANCIS M. WEBSTER.

No. 6434.—*Improvement in Destroying Weevil in Grain.*

I do not claim the use of heat separately, in the destruction of the weevil, as my invention, when the same is not combined with concussion of the grain infested with this insect, nor do I claim as new, the construction of a heater of any other than a prismatic form, with wide sides, having oblique adjustable cells therein.

But what I do claim as my invention, and desire to secure by letters patent, is the application of the combined action of heat and concussion to grain and other seeds, for the destruction of weevil and other insects, and the eggs and larva thereof, infesting the same, and separating other foreign matter therefrom, by means of a hollow prism, heated from its interior, and turning in a trough, the prism being surrounded by adjustable cells attached obliquely

across its sides, the whole being arranged and operated substantially in the manner and for the purposes herein set forth.

WM. WATSON.

No. 6435.—*Improvement in Apparatus for Spooling Yarn.*

What I claim as my invention, is the arrangement or arranging of the point or nose of the spindle within a short distance (say about one inch, or a half inch, or nearer if possible) from the yarn guide which is directly over it, and (that is in combination with) so applying the spindle to its supporting rail by means of a hinge slide or other equivalent, that it either may be inclined or turned down out of a vertical position, or be moved or slid outwards to such extent as to permit a cop to be placed on it without interference with either the guide rail or the yarn guide.

I also claim the arrangement of the friction fetter with respect to the yarn guide, in combination with the so supporting it on the guide rail by such a contrivance, viz: a hinged arm or slide, or its equivalent, as will admit of said fetter being moved away from the guide sufficiently for the purpose herein before stated, the said arrangement of the fetter with respect to the guide, consisting in placing it directly in front of, and partially below the guide, as above described, and as exhibited in the drawings.

GEORGE H. DODGE.

No. 6436.—*Improvement in Machinery for working Lumber into Irregular Forms.*

Having thus described the construction and operation of my improved apparatus for dressing irregular forms in wood, what I claim therein as new and desire to secure by letters patent, is the combination of the clamp tongs I, wedge J, rock shaft K, lever L, and inclined planes *m m*, with the carriage, substantially as herein described, for the purpose of holding and firmly supporting slender pieces while being subjected to the action of the cutters, but releasing them while their position is being changed.

RUFUS POWERS.

No. 6437.—*Improvement in Sewing Machines.*

Having thus described my improved sewing machine, what I claim therein as new, and of my invention, is as follows:—

I claim the stationary point *u*, (or any equivalent contrivance for supporting one end of the cloth) and moveable or adjustable clamping slider and point *w*, in combination with the line or series of points or wires *r r r*, &c., the whole being arranged and applied together, substantially in the manner and for the purpose as above specified.

JOTHAM S. CONANT.

No. 6438.—*Improved method of constructing and operating the Header in Bolt Machines.*

I claim the above described improvement in the heading machinery, or in other words, I do not claim a single header, operating by one or more blows or movements towards the gripping or holding dies; but that which I do claim as my invention, is the double header, constructed with an upsetting hollow frustum recess *a*, and a plane or projecting plane face, surface or die *b*, and

made to operate with respect to the gripping dies, substantially in manner as herein before specified; that is to say, by the action of the recess frustum die to first form a frustum on the end of the rod, and next by the action of the plane die *b*, to upset the same into the head space of the gripping dies, and thereby give to the head the form required, the sunken or recessed die having in the meantime been depressed in such manner as to bring the flat die *b*, into the proper position for the completion of the head.

D. L. WEATHERHEAD.

No. 6439.—*Improvement in Sewing Machines.*

I do not intend to confine my invention to the use of an endless belt alone, as a revolving circular table or a cylinder may be substituted therefor, the points being inserted in or made to project from the curved surface of either of them.

What I claim as my invention or improvement, in the sewing machine, is the combination with the endless cloth holder of the curved bar or piece of metal *v*, for discharging the cloth from its points after being sewed, all as described.

JOHN BACHELDER.

No. 6440.—*Improvement in preparing Metallic Patterns for Castings.*

What I claim in the before described process as of my invention and desire to secure by letters patent, is converting the surface of iron castings into plumbago, by treating them with dilute acid, and then reducing them to the required form and size, and smoothing and polishing them, substantially in the manner and for the purpose herein set forth.

THEODORE G. BUCKLIN.

No. 6441.—*Improvements in machinery for laying Ropes.*

What I claim therefore as my invention, is a combination consisting of the guard, its rope and weight, and the lever shaft f^2, with its arms, spring, shifting lever and catch, the whole being applied to the spindle C, essentially in manner and for the purpose specified.

I also claim the combination with the lever shaft f^2, having arms o^4, r^4, spring catch and shifting lever, as described, or any other suitable mechanical equivalent for shifting the driving belt from the fast to the loose pulley, the slide bar h^3, the spring lever i^3, having an arm m^3, and the pins g^3, inserted in the flyer head I, the said combination being for the purpose of arresting the motion of the machine on the breaking of a strand.

MARTIN GUILD.

No. 6442.—*Improvement in Annunciators for Railway Carriages.*

What I claim is as follows:

First. The combination above described to be operated by a movement of the trigger lever, by the conductor or any other person of the train, the said combination consisting—1st. Of the dial plate or disc, and its tubular shaft; 2d. Of the index hand and its shaft, the same having a ratchet wheel and retaining pawl or not, as circumstances may require; 3d. The notched wheel affixed to the dial plate shaft; 4th. The pawl of said notched plate; 5th. The main spring—the said main spring being so connected to the index and dial plate shafts as to cause the dial to operate or turn around in

one direction and indicate the stations, the whole being substantially as described.

Second. I claim, in combination with the mechanism above claimed, the mechanism for reversing the motion of the dial plate, the same consisting of gear wheels O, K, those fixed on the shaft n', and said shaft, the tri-armed lever p, q, r, and pinion t, the whole being applied together, and to the mechanism before claimed, and made to operate essentially as above specified.

Third. I claim, in combination with the mechanism herein first claimed, the mechanism which retards the rotary movement of the dial plate, and serves as an additional stop motion, the same consisting of the axle W, gears X, O, and Y, shaft z, pinion b, catch wheel and dog, the whole being made to operate and serve the purposes above mentioned.

Fourth. I claim, in combination with the mechanism herein before first claimed, the alarm apparatus, the same consisting of the gear wheel O, shaft g, pinion h, escapement wheel i, escapement k, pendulous hammer and bell, the whole being combined and made to operate essentially as described.

Fifth. In order to make the apparatus a self-operating or automatic machine, I claim a combination made up of the following elements or their mechanical equivalents, viz: 1st. One or more cams or inclined planes applied to the railway track; 2d. One or more legs b', c', affixed to a shaft connected with the car, also a cord or other contrivance so connected with the trigger lever and the shaft of the car as to be operated as described, when the leg passes up the inclined plane; 3d. The mechanism covered by the claim herein before first made, or any mechanism constructed and made to operate essentially like the same.

MASON H. FORD.

No. 6443.—*Improvement in machinery for dressing Staves.*

What I claim as new and desire to secure by letters patent, is the vibrating feeder bar M, in combination with the carriage frame O, which permits either the elevation or the depression of the rear end of the stave, when passing under the weighted levers L, L, as herein set forth.

Second. I also claim, in combination, the pressure levers L, L, acting independently of each other, but each in connection with a weighted lever, (L′, L′,) with the elevated plane support (N,) with convex and concave revolving cutters (p and p',) with the adjustable bevel edged plate (G,) and curved support (N′,) forming a throat, whereby a stave, while being pushed forward, substantially as described, and undergoing the process of dressing, is held in positions constantly adapted to the various thicknesses, crooks and windings of the timbers, without liability, to be cut across the grain, substantially as herein set forth.

Third. I also claim in combination the ratchet bar (B,) the lever (E,) tumbling shaft (F,) supporting hand (H,) weighted lever (J,) with the trigger or bent lever (I,) the pawls (K K K,) the tripping bar (P,) and disengaging check Q, on the carrying frame (O,) arranged and acting temporarily to sustain the stave while its rear end remains between the cutters (p p',) and after it has passed from under the weighted pressure levers L L, whereby the under thinning away of the stave near the end is prevented in the manner herein set forth.

Fourth. I also claim the auxiliary saw carriage (F′,) in combination with a moveable curved roller (B″,) and springs S″ & S‴, for regulating the breadth of the jointed stave to that of the bolt, as ascertained by gauging and adapting the amount of bevelling to the breadth, whereby staves of unequal breadths may be so jointed as to be used in setting up the same cask, as herein set forth.

Fifth. I also claim the combination of the reversed curved ways *t t*, and the endless chain working over angular or toothed rollers, with the swivel jointed dogs K K K, arranged and acting to receive the dressed stave and carry it forward, first in contact with one saw jointer and then with the other, whereby I am enabled to joint successively both edges of the stave before it leaves the machine, and avoid handling the staves after the jointing has been commenced, substantially as herein set forth; but I do not claim or use the manner of making an endless chain rim in a curve for that purpose.

Sixth. I also claim the manner of arranging the adjustable jointing saw (*c*″,) curved roller (B″,) and supporting springs (S″,) projection O′, and spring bars *c*‴, whereby the true jointing of straight, crooked or twisted staves is effected, the roller constituting with the springs a throat through which the dressed stave is made to pass in contact with the jointing saw, thereby enabling the bevel in every part of the length to correspond to the cross section of the stave, substantially as herein set forth; not intending in these claims to limit myself to the exact arrangements described, but to vary the same at pleasure, while I accomplish the same ends by means substantially the same.

HERVEY LAW.

No. 6444.—*Improvement in Machinery for cutting Soles of Boots and Shoes.*

What I claim as my invention is as follows: that is to say, I claim the combination of the four frames B B′, E E′, and the moving toe knife frame, for receiving and holding the shaping blocks of the cutting knives, the said frames being connected and operated by screws in manner and for the purpose as above specified.

I also claim the combination of two sets *p q*, and *r s*, or *p′ q′ r′ s′*, of holding and shaping blocks operated as above specified, and whether used on either or both sides of the machine, and for the purpose of sharpening the knife w^9, so as to cut a right or left sole, of what are termed "*rights and lefts*," all as above set forth.

ABRAM D. BOYNTON.

No. 6445.—*Improvement in Tarring Rope Yarns.*

I lay no claim to the process of tarring yarns, as it is ordinarily conducted, viz: that wherein the tar is first either heated or boiled, and while so heated or boiled the yarns are passed through it, they being at their entrance into the tar at the temperature of the surrounding atmosphere; but what I do claim as my invention, is my improvement on the said process; the said improvement consisting in heating the yarns previous to their immersion in or passage through the tar, and using the tar either at the temperature of the atmosphere surrounding it, or at a temperature of blood heat or thereabouts, and not one which shall materially volatilize or evaporate its essential oil or spirit, in comparison with the evaporating of the same, which takes place under the old process above described.

WILLIAM MONTGOMERY.

No. 6446.—*Improvement in the Combustion of Fuel.*

I do not intend to claim as my invention any particular form of steam boiler, reverberatory furnace, or water or air heating system of tubes, and I would have it understood that I do not confine myself to the details herein described so long as the peculiar character of my invention be retained; nor do I claim the mere admission of air, heated or cold, above the fire bars, as I am aware that this has already been done; but what I do claim, is the mode of constructing furnaces whereby numerous streams of air are caused to pass above the fire bars, through perforated fire brick, lump or suitable stone at the sides and front of such furnaces, in combination with the arrangement for making the products of combustion pass through and beyond reticulate partitions of the same materials, before they come in contact with the surfaces or objects intended to be heated, in the manner and for the purposes substantially as herein set forth.

RICHARD COAD.

No. 6447.—*Improvement in Machines for cutting and slitting Cheese Hoops, &c.*

Having thus described my invention, I claim the knife stock F, attached to the moveable frame in such a manner as to swing up the knife I, for the purpose of sharpening the same either by attaching the stock to the frame by hinges above and a clasp below, or for such equivalents as will make the knife stock moveable, in the manner and for the purpose set forth.

I also claim the combination of the moveable face plate E, with the slide or stock J, in such a manner that the position of the face plate can be changed during the operation of the machine, for the purpose of counteracting the effects produced by the springing of the knife I, in passing through the central and hardest portion of a piece of wood, and thereby enabling the operator to perfectly govern the thickness of the veneers or splints cut from different parts of the same piece of wood without stopping the machine.

I also claim the combination of the pointed slitters Q^2, with the slide or stock J, in such a manner that they (the pointed slitters) can, while the machine is in motion, be thrown into use to act in combination with the knife I, when their services are required, and be thrown out of use again without stopping the machine, when their services are no longer needed, substantially as herein set forth.

PATRICK BRYANT.

No. 6448.—*Improvement in the Cut-off and Steam-stop of Rotary Engines.*

What I claim as my invention and desire to secure by letters patent, is the cut-off valves V, V, constructed with apertures through them, and fastened to the steam-stops, acting in the manner and for the purpose herein described.

I also claim the combination of the cut-off valve and of the curved apertures *w*, with the arc and radius steam-stops, arranged in the manner and for the purpose set forth.

JOSEPH W. WEBB.

No. 6449.—*Improvement in Chimney Caps.*

I am aware that many plans for producing similar effects have been essayed, and some are patented and in use, one of which seeks to provide

for these objects by making the shaft conical, with outer frusta, of *direct* cones, so fitted that the action of the exterior current is nearly or entirely lateral or horizontal within and across the shaft or flue; but I do not know of any other arrangement for these purposes in which, by the application of direct and *inverted* conical or pyramidal frusta, the exterior current, as it strikes the cones and enters the shaft, is forced to travel in nearly direct vertical lines, until it arrives at the final exit, on the leward side of the apparatus; therefore, I claim as new and of my own invention and desire to secure by letters patent of the United States, the application of the obtuse frustum 2, having holes 3, opening under the frustum *b*, to admit the exterior current of air into the truncated continuation 4, of the shaft *a*, when such application is in combination with the *inverted* frustum *c*, above and detached from but surrounding the part 4, to pass the exterior current under the cap *d*, the whole combined and operating substantially as described and shown.

CHARLES K. SCUDDER.

No. 6450.—*Improvement in Harvesters.*

Having thus described the construction and operation of our improved harvesting machine, what we claim therein as new and desire to secure by letters patent, is giving to a vibrating blade a compound transverse and horizontal stroke or cut, by combining it with jointed vibrating levers, (*m*,) or other similar device, capable of producing the same movement, when the same is combined with stationary teeth, (*h*,) or a reel, (*b*,) substantially in the manner and for the purpose herein set forth.

JAMES L. FOUNTAIN.
HENRY K. FOUNTAIN.

No. 6451.—*Improvement in Bedstead Fastenings.*

Having thus fully described my invention, what I claim therein and desire to secure by letters patent, is fastening the post of a bedstead to the rail, (or the rail to the post,) by means of a hook, wedge shaped from point to butt, next its attachment, and a groove having a catch pin therein, which groove is concentric with the axis of the joint, substantially as described and set forth, whether placed at one or another point of the sweep of its circle, the hook being correspondingly attached.

JAMES BROOKE.

No. 6452.—*Improvement in Grain Separators.*

What I claim as my invention and desire to secure by letters patent, is the construction and use of a fly or paddle marked G, to carry the grain and chaff from carrier P, to carrier O.

HOMER SMITH.

No. 6453.—*Improved Lock for Fire Arms.*

I *do not* claim the invention of a sear, nor the hanging together of the hammer and trigger, (or cocking lever,) but that which I *do claim* and desire to secure by letters patent, is the combination of the *sear* "*a*," the *set* or *tumbler* "*b*," and the *set* or *tumbler screw* "*c*," or its equivalent, whether the

Second. Giving the twelve musical intervals distinct names, so that the use of the words flat and sharp is entirely avoided, and with them all the confusion naturally arising in the mind of a beginner.

Third. Representing the sounds usually called natural by one uniform color, and those commonly called flats and sharps by another uniform color, so that they may be distinguished from each other by a mere inspection of the musical character representing the note, without the use of chromatic signatures.

ERNEST VON HEERINGEN.

No. 6529.—*Improvement in Inhalers or Lung Protectors.*

What I claim as my invention and desire to secure by letters patent, is —

First. I claim the nose or mouth joint having the piece I, made to fit the nostrils or the mouth, in combination with the valves A and B, for the purpose of causing the air to enter and be discharged through separate orifices, as herein described.

Second. In combination with the said nose or mouth joint and valves, I claim the filterer D, either with or without the tube E, as described.

LEWIS PHECTIC HASLETT.

No. 6530.—*Improvement in Cooking Stoves.*

I wish it to be distinctly understood that I do not limit myself to the application of this method of lining and protecting plates to the shifting plates used in the tops of stoves, but that the same may be applied to the tops of stoves when made in any other way.

What I claim as my invention and desire to secure by letters patent, is the method, substantially as described, of equalizing the heat in the oven by combining with the diving flue at the back and the series of tubular flues at the bottom, with spaces between them, the return flue below the flue tubes, and the return flue at the back of the diving flue, substantially as described.

And I also claim the method of protecting the top plate of the stove or the parts thereof, by lining it or them with a perforated plate or plates, with some earthy cement or other refractory substance interposed between the plate or plates and the perforated lining, as described.

JORDAN L. MOTT.

No. 6531.—*Improvement in Reed Musical Instruments.*

What we claim as our invention and desire to secure by letters patent, is the converting the wind chest (B,) in which the reeds *m*, are located into an expansible sounding chamber by forming one side of it (the said wind chest) of a thin elastic sounding board (*c*,) placed in sufficiently near proximity to the reeds—when this arrangement is combined with the location of the valves on the outside of the wind chest or sounding chamber, substantially in the manner and for the purpose herein set forth.

B. T. BLODGET.
H. B. HORTON.

No. 6532.—*Improvement in Washing Machines.*

I do not limit myself to the materials, dimensions nor proportions set forth in these specifications and drawings of the machine in its various parts, but claim as my invention and desire to secure by letters patent, the combination

No. 6458.—*Improvements in Boring and Mortising Machines.*

What I claim as my invention and desire to secure by letters patent, is the combination of an auger and two chisels, with the several parts which regulate their operation for the purpose of boring and mortising hubs, as the method by which the auger is brought to use through the auger gate X, fig. 2, the stands *n n m*, and *k*, with the arrangement of the pulleys Z Y N, and M, the operation and government of two chisels through the use of fenders B B, long cog on chisel stock (see 6 fig. 9,) slides C C, and spring catch 8, fig. 7, wedges E E, and rag-iron 7, fig. 7, rods and springs O O, stoppers F F, and springs which throw the fenders apart laterally, the combination being more particularly described in the foregoing specifications.

CHANDLER CARTER.

No. 6459.—*Improvement in Bench Planes.*

We claim constructing and applying the bitt or cutter, substantially as described, that its lower surface may constitute that part of the surface of the plane back of the cutting edge, in combination with the hollow stock for the passage and delivery of shavings, substantially as described.

CHARLES S. BEARDSLEY.
SIMEON WOOD.

No. 6460. — *Improved method of manufacturing Drop Shot.*

What I claim as new and desire to secure by letters patent of the United States, is the application of an ascending artificial current of air, to cool the descending metal, in the manufacture of drop shot.

DAVID SMITH.

No. 6461. — *Improvement in Speeder Fliers.*

What I claim as my invention, and for which I wish to obtain letters patent, is the making of the flier of hollow tubular arms, constructed as herein described, of equal thickness throughout, combined with the top and bottom piece, substantially in the manner and for the purposes set forth, whereby the condensation of moisture is almost entirely obviated, which is so injurious in practice with the ordinary flier; the tube through which the roving passes is enlarged to the greatest possible dimensions, the parts are greatly increased in stiffness and lightness, and are found to be more durable, and require less power to drive them, and by this mode of construction, I am enabled to use a material, to wit, steel, that has never before been deemed practicable.

T. T. ABBOT.

No. 6462. — *Disc Cut-off acted upon and regulated by the Governor.*

What I claim as my invention and desire to secure by letters patent, is the apparatus set forth in the above specification, viz:—

A cylinder moving freely on the spindle of the governor of the steam engine, and operated by the balls thereof, having therein a slot or slots with one vertical and one inclined side, by means of which levers and other apparatus arranged essentially as described in the above specification, regulate the opening and shutting of a throttle valve in the steam pipe, so as to cut off the steam at any desired portion of the stroke, varying according to the speed of the engine.

WILLIAM McCAMMON.

No 6463.—*Improvements in Cotton Gins.*

I do not claim the frame, gearing, rollers, brushes, vibrating hopper and fingers of the roller cotton gin as new.

But what I do claim as my invention and desire to secure by letters patent in the before described improved roller cotton gin, is first, the combination of the adjustable bearings or boxes C K, and screws I F and C^2, with the rollers H *h*, and hinged caps M, for supporting, holding and adjusting the rollers at the several points between their ends, where said bearings are applied and are liable to wear, arranged and operating substantially in the manner and for the purpose set forth, by which the operator is enabled to retain a parallelism of revolving surfaces, however unevenly the bearings may wear, the rollers being made to coincide by separate and independent screws and taps or wedges, or in any way by which the same object may be attained, and by which the rollers shall be made to produce equal pressure on the cotton wool as it passes between them.

Second. I likewise claim the combination of the hinged caps M, with the hinged plate N, forming the upper end bearings, and the brush block S^2, and brushes S, arranged and operating in such manner as to admit of their being raised from the rolls.

WM. Y. LAYTON.

No. 6464.—*Improvements in Mill Shafting.*

I do not claim the suspending a box or bearing on pivots, this having been done before; nor do I claim the making the hanger in several parts; but what I do claim as my invention and desire to secure by letters patent, is the general arrangement and construction of the complete hanger with or without the oil-catcher forming a part thereof, made substantially in the manner and for the purposes herein above described.

EDWARD BANCROFT.

No. 6465.—*Improvement in Hames.*

What I claim as my invention and desire to secure by letters patent, is hinging the cliffs to the hame, and extending them back to the girth, substantially as herein described, for the purpose of holding the hame flat against and in contact with the entire length of the shoulder of the horse, in every position he may assume, while in the act of pulling.

JOSEPH W. BRIGGS.

No. 6466.—*Method of Opening, Shutting, and Fastening Blinds.*

What I claim as my invention and desire to secure by letters patent, is the combination of the turning rack ( ) with the fixed and moveable pinions ( ) attached to the hinge ( ) substantially in the manner and for the purpose herein described.

WESLEY CHASE.

No 6467.—*Improved Key-hole Protector.*

I lay no claim to a box made so as to permit the slide to move out of it as a bolt does out of a common lock; but what I do claim, is a series of slide plates or tumblers, or their equivalents, and a key passage D C E, for operating the same (by means of a key) so applied to the slide F, and enclosing case A, as to enable a person to insert the key and throw or move the slide or gate forwards or backwards without, either while the slide or gate is being thrown forwards, or is being retracted, there being any such communication

with the interior of the case, as will allow of the admission of gunpowder or any explosive solid material therein, substantially as above specified, the said slide or bolt tumblers and key passage being enclosed or included in a close box A, and the whole forming together a "key hole protector," as explained.

EDWARD KERSHAW.

No. 6468.— *Improvements in Propelling Vessels by Reaction.*

I do not claim propelling vessels by discharge of water, nor do I claim discharging the water through different apertures that may be closed at pleasure, to steer the vessel; nor do I claim the application of any of the well known forms of centrifugal pumps to this particular purpose; but what I do claim as my invention, and for which I desire letters patent, is—

First. The combination of a centrifugal pump, constructed substantially as herein described, with the curved guide plates "X X," figure 7, by which means the water is put in motion, and raised and discharged with less expenditure of force than the ordinary means now in use for propelling vessels by means of pumps.

Second. I claim the bent nozzle pipe attached to the stationary pipe, and capable of motion in a vertical plane, by means of which the water may be discharged either fore or aft, up or down, with only one aperture, and without the use of valves.

M. W. RUTHVEN.

No. 6469.—*Improved method of lifting Vessels over Shoals.*

What I claim as my invention and desire to secure by letters patent, is the combination of expansible buoyant chambers, placed at the sides of a vessel, with the main shaft or shafts C, by means of the sliding spars or shafts D, which pass down through the buoyant chambers, and are made fast to their bottoms and the series of ropes and pulleys, or their equivalents, in such a manner that by turning the main shaft or shafts in one direction, the buoyant chambers will be forced downwards into the water, and at the same time expanded and filled with air for buoying up the vessel by the displacement of water, and by turning the shaft in an opposite direction, the buoyant chambers will be contracted into a small space, and secured against injury.

A. LINCOLN.

No. 6470.—*Improvement in Machines for Jointing Staves.*

I claim the combination of the inclined angular levers (*b*,) with the oblong plates (*d*,) secured to the edges of the sliding frame B, for holding the ends of the stave during the operation of jointing, as described before.

WILLIAM H. SEYMOUR.

No. 6471.—*Improvement in Imitations of Marble.*

What I claim as my discovery and desire to secure by letters patent in the before described process of marbling minerals, woods and other substances, is

First. The employmont of strong acids, as herein described, in the preparation and application of colors for producing appearances of marble on woods and minerals.

Second. I claim the application of lime and nitre, as receiving mordants adapted to minerals and wood, where veins or variations are to be produced, imitating marble, as herein set forth.

Third. I claim the use of mucilaginous pastes composed of corn meal, slippery elm bark, or rice water, applied to canvas, paper, gum elastic, &c., &c., for purposes stated in the specification.

Fourth. I claim the process of preparing and of transferring the colors from a temporary to a permanent ground, in the manner and for the purposes described.

Fifth. I claim the composition of glass, lime, shellac, nitro muriate of zinc, or aqua regia and alcohol as a compound hard polish for marbling wood and porous mineral surfaces, as before described.

SAMUEL W. DAVIS.

No. 6472.—*Improvement in Spring Saddles.*

What we claim as our invention and desire to secure by letters patent, is the combination and arrangement of the bent tension springs C C, for supporting the saddle seat, with the pommel and cantel of the tree, in such a manner as to effectually preserve the proper form of the springs, and also prevent all upward reaction and tremor of the same when in use, substantially as herein set forth, to wit: securing the front ends of the spring C C, to the sides of the pommel by means of bolts or screws, and springing the rear ends of the said springs into inclined groves *e e*, formed in the cantel and confining them therein by the screws *f f*, passing through slots in the springs into the bottoms of the said grooves *e e*.

JEREMIAH RHOADES.
WILLIAM POULEY.

No. 6473.—*Improved Shank for Mineral Door Knobs.*

Having thus fully described the nature, construction and operation of my invention, what I claim as new and desire to secure by letters patent, is making mineral knobs or other analogous articles, such as curtain pins, draw handles, &c., by inserting a tubular metallic shank (with or without slots or a longitudinal slit) into the vitreous or earthen matter at a proper stage of the process, so that the quantity of metal in proportion to the bulk of mineral admissible in the case and comparatively to the extent of surface in contact with the mineral is very small, and the mineral consequently allowed to take its set about, within, or around the more or less elastic shank, without any undue strain upon or disturbance with its crystallization; thus rendering the destructive tendencies arising from the unequal expansibility of the metal and mineral too slight practically to endanger the soundness and durability of the finished knob or other analogous articles, such as curtain pins, draw handles, &c.

JOSHUA LAIRD.

No. 6474.—*Improvement in Scythe Nibs.*

What I claim as my invention and desire to secure by letters patent, is the wrench part *b*, of the screw rod, as seen in figure 7, combined with the rings *c* and *d*, for fastening the nib upon the snath, as described and represented, to effect the objects stated in the first, second, third and fourth particulars herein before stated.

DAVID SAWYER.

No. 6475.—*Improvement in Harvesters of Clover Heads.*

What I claim as my invention and desire to secure by letters patent, is—

First. The combination and arrangement of the transverse pendent finger

bar I, the mortised right angled plates F, adjustive slide bars G, and knife or cutter K, with the revolving axletree of spring conveyor bars P, arranged and operating in the manner described, by which the heads of clover are severed from the stems or stalks, and conveyed to a receiver.

Second. I also claim the combination of the right angled rods L, fingers J, and pendent bar I, with the transverse timber M, for adjusting the knife and fingers longitudinally and vertically in connection with the spring conveyor bars P, as described and represented. JOHN HINTON.

No. 6476.—*Improvement in Harvesting Machines.*

Having thus fully described the nature and construction of my improvements, what I claim therein as new and desire to secure by letters patent, is constructing the platform separate from the other frame work, as described, so that it can be readily put together or removed and the mower attached, as herein fully described and made known.

ALFRED JAMES PURVIANCE.

No. 6477.—*Improvement in Buckles for Harness.*

What I claim as my invention and desire to secure by letters patent, is the safety plate, buckle frame and tongue, combined together in the manner and for the purposes set forth in the accompanying drawing and specification.

HIRAM TODD.

No. 6478.—*Improvement in Cooking Stoves.*

What I therefore claim as of my invention, is the combination of the central upright steam column E, with the stationary top plate D, and the fire chamber made to rotate or turn around underneath the said top plate, all substantially as above specified.

I also claim the plate K′, and space M, over it, as combined with the fuel chamber and rotary plate I, and made to revolve simultaneously with them in manner and for the purpose essentially as above specified.

DANIEL DUNHAM.

No. 6479.—*Improvement in Cooking Stoves.*

What I claim as my invention and desire to secure by letters patent, is the dropping of the flue *s t*, below the level of the hearth plate, in combination with the two ovens, arranged in the manner herein set forth and described.

HORACE HALBERT.

No. 6480.—*Direct and Counter Motion Winch.*

I do not claim to have invented a winch head, or any of the parts herein described and shown, irrespective of the manner in which I have applied and used them; but I do claim as new and desire to secure by letters patent of the United States, the application of the female ratchet 13, conjointly with the mechanical arrangement of the head or cap *d*, with the two reversing pawls 9 and 10, and lever socket 7, to produce a winch that shall be worked by a handspike or lever, moving in either direction on the winch centre, for the purposes and substantially in the manner before described.

CHARLES PERLEY.

No. 6481.—*Improvement in Machinery for cutting Welts for Shoes.*

What I claim as my invention, is the combination of the strip holder with the knife, base block, spring gauge plate G, spring support plate L, and ledge F, the whole forming a machine for manufacturing welts, substantially as above specified.

CHARLES ROGERS.

No. 6482.—*Improved method of attaching the Tang to the handle of Table Cutlery.*

What I claim as my invention, is the above described mode of constructing and combining or fixing together the handle and tang of the blade of a knife or piece of cutlery, the same consisting in making the said tang with one or more stationary studs or projections, in combination with making the main tang passage of the handle, with lateral and transverse passages for the entrance and reception of the said projection or projections, during the process of cementing, all substantially as herein before specified; the handle by such means being firmly secured to the blade or tang thereof, and so as to permit no appearance of any rivet on its external surface.

DAVID N. ROPES.

No. 6483.—*Improvement in Bedstead Fastenings.*

What I claim as my invention and desire to secure by letters patent, is the construction of metallic fastenings, for confining the rails and posts of bedsteads to each other, of such forms that when the portions of the fastenings secured in the ends of the rails are inserted into the portions of the fastenings attached to the posts, a blow or downward pressure upon the rails will cause the ends of the rails to be closely drawn against and secured to the posts, when this is combined with the arrangement by which the elevation of the rails for a short distance will permit them to revolve and detach themselves from the cords or sacking that may be connected to them, and also disconnect the portions of the fastenings projecting from the extremities of the rails from their hold upon the fastenings made fast to the posts, without withdrawing one from the other, substantially in the manner and for the purpose herein set forth.

DEVOLT STOTLEMEYER.

No. 6484.—*Improvements in Boring Machines.*

What I claim as my invention and desire to secure by letters patent, is the combination of the boring apparatus with the four jointed posts B, C, D, and E, the mode of adjusting the frame G, by means of the straps F, and H, and the windlass shafts and the jointed post, as herein described.

WILLIAM HENRY WILLCOX.

No. 6485.—*Improvement in Stops for Carpenters' Benches.*

What we claim as our invention and desire to secure by letters patent, is that peculiarity of the construction of the socket C, D, which consists in the vertical aperture K.

LEBBEUS AUGUR.
JAMES L. LORD.

No. 6486.—*Improvement in Pumps.*

What I claim as my invention and desire to secure by letters patent, is the union of two parallel pump cylinders, by means of a curved pipe, as herein described, and the working of pistons with valves in each, said pistons being united in motion and the valves arranged, substantially as herein set forth. I also claim the union of two such pumps in the manner and for the purpose herein described. GEORGE W. FULTON.

No. 6487.—*Improvements in Looms.*

Having thus fully described my improvement, what I claim therein as new and for which I desire to secure letters patent, is the combination of the quadrant, wheel or trammel with the cam shaft of a power loom, by means of which I can locate the said shaft in the position of the crank shaft, and dispense with one shaft and the ordinary gearing connected therewith.

JOHN WILSON.

No. 6488.—*Improvement in Gates.*

Having thus described my invention, I shall state my claims as follows:

What I claim as my invention and desire to have secured to me by letters patent, is a single or double gate, constructed substantially as herein above described, so as to turn up vertically by the parallel movement of the rails, &c., in lieu of swinging each way in the ordinary manner.

LORENZO SMITH.

No. 6489.—*Improvement in Brakes for Carriages.*

What I claim as my invention and desire to secure by letters patent, is—First. The combination of the levers P, P, with the levers L, L, rods N, N, bar G, sliding rod H, and rubbers F, F, arranged and operated substantially as above described and for the purpose set forth.

GIDEON GRIEST.

No. 6490.—*Improvement in Cockeyes for Harness.*

Having thus described the manner of constructing my improved cockeye, what I claim therein as new and desire to secure by letters patent, is the combination of the loop of the trace with a sectional cross piece, (B,) and a cockeye, (A,) whereby the trace is secured to a swivel cockeye without impairing its strength, and all the metallic parts are adapted to being made of cast metal. JOSEPH W. BRIGGS.

No. 6491.—*Improvement in Extension Machines for raising Bricks, Mortar, &c.*

Having thus fully described my machinery for raising bricks and mortar for buildings and other purposes, I do not claim the mode of extension or of elevating the platforms, but I claim combining the two series of extension frames, substantially as described, so that one may act as a counterpoise to the other when in use, and that when out of use the two frames may be brought down upon a level, for convenience of transportation, and occupy but little room, and also that the relative height of the series may be adjusted, for the purpose and in the manner described, or by any analogous mechanical devices.

JAMES COX.

No. 6492.—*Improvement in making Ivory fine-tooth Combs.*

What we claim as our invention, and desire to secure by letters patent, is the constructing a comb of four pieces of ivory or other material, united substantially in the manner herein set forth, to wit; two comb plates *a a*, having their inner edges bevelled off and joined to each other by means of the two strips *b b*, placed opposite to each other, over the bevelled edges of the plates (*a a*,) and connected by a row of rivets passing through the centres of the strips, and through the bevelled edge of each comb plate, as described herein, and represented in the accompanying drawings.

FENNER BUSH.
JULIUS H. PRATT.

No. 6493.—*Improved Railroad Turnout.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the switch rails A A, with the frog latch F, in such a manner that the frog latch F, is forced to move simultaneously with the switch rails A A, by means of a series of rods and levers, arranged and connected substantially as herein described.

CARLTON DUTTON.

No. 6494.— *Improvement in Bee Hives.*

What I claim as my invention and desire to secure by letters patent, is the employment of the slide door 3, in combination with the open galleries above and below the same, for the purpose of separating or combining, at the will of the apiary, the several tiers of chambers, as described and represented. I also claim the use of the dark chamber *i*, with a passage out of the same, through the main body of the working hives, for the purpose of domesticating wild or foreign bees, by compelling them in leaving the dark chamber to pass through or into the working chambers of the bee house.

ARZA GILMORE.

No. 6495.—*Improved Trap and method of Setting it.*

What I claim as my invention and desire to secure by letters patent, is the combination of the hook, the straight bar to which it is attached by a pivot, and the spring, the whole arranged and acting substantially as herein described, by which I am enabled to set the trap without a catch or lock of any kind.

THOMAS A. DAVIES.

No. 6496.—*Improved Tent Frames.*

Having thus fully described my improved tent, what I claim therein as new, and for which I desire to secure letters patent, is constructing a tent substantially in the manner described; with a series of poles jointed together at the centre, and having spade formed feet, by which it is anchored to the ground without pins or other fastening, as herein fully set forth.

JESSE E. DOW.

No. 6497.—*Improvement in Grain Drills.*

What I claim as my invention is shifting the hoppers back and forward with couplings and levers, substantially as set forth, to continue or stop the seeding, in combination with the shaker, having moveable dies therein, for reg-

ulating the quantity of seed, and distributing the same, and moved substantially as herein described.

EDWARD STEACY.

No. 6498. — *Improvement in Wind Mills.*

What I claim as my invention and desire to secure by letters patent, is the combination of the curved bars E, connected to the radial arms B, by hinged plates or bars *e*, connecting bars *g*, hubs *h r*, connected together by a rod *s*, forked lever *k*, and governor *o*, for regulating the speed of the wheel, in the manner herein described.

I likewise claim the mode of raising and lowering the sails, when desired, by means of the bands or cords L, attached to the hub K, connected to the hub *r*, below by the rod *s*, passing over the pullies *t u v w*, and attached in their course at the point *x*, fig. 3, to the cords *p*, passing over the pullies *q*, and secured to the peaks of the sails, and the worm or screw pullies *d*, on the rollers D, as herein set forth.

CHARLES B. HUTCHINSON.

No. 6499. — *Improvement in Parlor Cooking Stoves.*

I claim the employment of a double top plate, constructed as described, the upper part of which is whole, and is removable at pleasure, while the lower portion is furnished with apertures for boiler holes, which are covered with ordinary covers, as set forth, both parts of the double top being made the full size of the stove.

E. R. BROWN.

No. 6500.—*Improvement in Pumps.*

What I claim as my invention and desire to secure by letters patent, is the combination of the nozzle with the pump barrel, in such a manner that the nozzle can be readily changed from side to side, and secured in any desired position, substantially as herein represented and described.

BIRDSILL HOLLEY.

No. 6501.—*Improvement in Corn Ploughs.*

What I claim as my invention and desire to secure by letters patent, is the auxiliary cultivator teeth H, in the outer ends of the drag F, as described and represented.

STEPHEN COATS.

No. 6502. —*Improvement in Metallic Alloys.*

What I claim as my invention and discovery and desire to secure by letters patent, is the composition, as described, composed of zinc and iron combined with each other, when in a fused state, and the application and use of said composition to the purposes above specified, and to any other useful purpose to which it may be applied.

H. B. BABCOCK.

No. 6503.—*Improvement in the consumption of Fuel in Steam Boiler and other Furnaces.*

Having thus described my improvements in burning fuel, what I claim therein as new and for which I desire to secure letters patent, is the employment, arrangement, and combination of apparatus, constructed substantially

as herein described, for consuming the gases arising from ignited fuel, by the introduction of decomposed steam, or the gases resulting therefrom, and atmospheric air in a highly heated state over fire. I also claim the revolving grate, constructed and operating as herein above described and made known.

CHRISTIAN BURCKHARDT.

No. 6504.—*Improvement in Seed Planters.*

Having thus described the construction and operation of my improved seed drill, what I claim therein as new and desire to secure by letters patent, is—

First. The manner of guiding the machine by changing the position of the tongue, substantially in the manner herein set forth.

Second. The combination, substantially as described, of the lever *r*, and link *q*, ... with the beam K, and tooth L, for the purpose of drawing back the point of the tooth at the same time the beam is raised, whereby the tooth is easily kept clear of sods, roots, and other obstructions, and the danger of its getting broken diminished.

J. D. WILLOUGHBY.

No. 6505.—*Improvement in Smut Machines.*

Having thus fully described my improved machine for clearing the garlic and smut from grain, what I claim therein as new and for which I desire to secure letters patent, is the combination with each other of the inclined and horizontal runners *t* and *f*, and constructed substantially as above set forth, for the purpose of more perfectly separating smut and garlic from wheat.

JOSEPH HEYGEL.

No. 6506.—*Improvement in Sun Dials.*

I am aware that it is not uncommon to place on a dial plate a scale of the sun's declination, I therefore lay no claim to such; but that which I do claim as my invention, is the shadow indicator or pin I, and declination scale, or scale of months and days, in combination with the gnomon, substantially in the manner and for the purpose as specified.

JAMES SCOTT.

No. 6507.—*Improved Steering Apparatus.*

Having thus described my improved steering wheel, I will state my claim as follows:

What I claim as my invention and desire to have secured to me by letters patent, is the combination of a right and left threaded screw on the hand wheel shaft *a*, *a*, with two half nuts *d*, *d*, arranged one on each side of said screw, and traversing in guides opposite to each other, as herein above set forth, said nuts being connected to the rudder head, either by the long arms *o*, *p*, *o*, *p*, as in the first described arrangement, or, as in the second, by the slotted arms *a'*, *a'*, and sliding buttons *c'*, *c'*, all arranged and operating substantially as herein above set forth.

JESSE REED.

No. 6508.—*Improvement in Sub-soil Corn Ploughs.*

What I claim as my invention and desire to secure by letters patent, is the construction of my *sub-soil plough* shares, in combination with the small

ploughs fastened above them on the same standards, and having a space between them, in the manner and for the purpose represented and described.

HENRY BACON.

No. 6509.—*Improved Shank Painter Stopper.*

We do not claim to have invented any of the foregoing parts, irrespective of the manner in which we have arranged and applied them for these purposes; but we do claim as new and of our own invention, and desire to secure by letters patent of the United States, the application, arrangement, and combination of the parts described and shown, by which the lock piece *e*, with ears or shoulders 8, 8, places any ultimate strain upon the fixed fillets 7, 7, and through the lug 12, and pin 11, secures all the operative parts from moving by accidental causes, at the same time providing means, through the attached chain 10, by which one man can release or "let go" the anchor, without other manual help, and without other mechanical aid than that furnished by the parts attached and employed, when constructed and combined substantially in the manner described and shown.

CHARLES PERLEY.
JOSHUA TERREY.

No. 6510.—*Chills for casting Rasps, Files, &c.*

I would have it understood that I do not claim as my invention the making chill dies in one or more pieces for casting, but what I do claim as my invention and desire to secure by letters patent, is the method herein described, of casting floats, rasps, graters, etc., by means of a series of chill dies, constructed and used as herein described, the essential in the construction of such chills being that there is one piece for every series of teeth, and that the latter are cast in indentions formed between the chills, the same being formed substantially in the manner and for the purpose herein set forth and made known.

EZRA RIPLEY.

No. 6511.—*Improvement in Cultivators.*

What I claim as my invention and desire to secure by letters patent, is the mode of adjusting the position of the shovels D, so as to throw the earth *from* or *toward* the rows of corn, or to the right and left at pleasure, by means of the before described combination of the levers L, links N, and adjustive bars I, with the parallel slotted bars B, and oblique hinged bars Q, as described.

GEORGE W. BROWN.

No. 6512.—*Improvement in Shoulder Braces.*

Having thus fully described the parts and combination of parts and the operation of the shoulder brace and chest expander, and shown the several modes in which the instrument may be rendered useful, I hereby declare, that I do not claim to have invented a metallic coiled spring with horizontal arms, although I do not know of any spring of the kind herein described having been essayed for the same purpose, or the shoulder straps, or any of the separate parts of the instrument; but what is claimed therein as my invention, is the employment of the metallic coiled spring, with one or more coils in combination with shoulder straps, with or without islet holes and lace, tugs and pads, substantially as and for the purposes described.

S. S. FITCH.

No. 6513.—*Machinery for operating Railroad Gates by means of the Locomotive.*

Having thus described my invention, I claim the vibrating cam levers G, and H, attached to the bars F F, in combination with the cam block O, and the spring L, and the rope or chain M, passing over the pulley N, and the spring K, for the purpose of closing and opening the gate by the action of the projecting bar I, of the locomotive upon the vibrating levers G and H, in the manner substantially as herein described.

RICHARD COFFIN.

No. 6514.—*Improved Gun Lock.*

What I claim as new and desire to secure in letters patent, is the adjustable slot *d*, in the centre hole and fulcrum of the trigger B, acting in direct combination with the spring D, and also in combination with the arm *e*, of the hammer A, and the main spring C, substantially as described.

WM. W. MARSTON.

No. 6515.—*Improvements in the Boom Derrick.*

Having thus fully explained my invention, what I claim therein as new and desire to secure by letters patent, is the drum F, as constructed with its inner shaft X, with its arrangement for giving independent motion, by means of which the ropes can be housed and protected in combination with the adjustable rotary cross beam I I, arranged and operated as described, by means of which combination and arrangement I am enabled to have in wear only such portions of the ropes as the operation of the machine and the varying elevation of the wall or structure may demand.

GEORGE E. WARNER.

No. 6516.—*Improvement in Seed Planters.*

I do not claim the wheels, planting cylinders, hoppers, frame, hinged beams, cultivator teeth, funnel conductors, or seed spouts, as these are made and arranged in the usual manner; but what I do claim as my invention and improvement and desire to secure by letters patent, is—

First. The combination of the roller L, springs K, and lever M, with the rack N, to which the cultivator teeth G, are affixed for regulating the depth of furrowing in various kinds of hard or mellow soil, without the necessity of altering the position of the transverse beams to which the rear ends of the parallel longitudinal beams H, are connected.

Second. I also claim the manner of preventing the seed passing from the hopper through the channels of the planting cylinder, when the cultivator teeth are raised from the ground, or whenever it is desired to stop the planting operation by means of the combination of the transverse rising and falling bar J, cams S, bent rods R, sliding bar Q, valve rods P, and springs T, with the frame A, as described.

Third. I likewise claim placing the radial pins in the channels of the planting cylinders, in the manner and for the purpose above set forth.

DAVID DIEHL.

No. 6517.—*Improvement in Harvesters.*

What I claim as my invention and desire to secure by letters patent, is the combination of a series of removable cutters, with the links of an endless revolving chain which carries them successively into contact with the grass or grain to be cut, substantially as herein described, whether the cutters be contiguous or placed at intervals upon the chain.

I also claim making one end of each cutter sharp, in order that by pressing against the adjacent end of the next cutter, straw, grass, or other intervening obstructions may be cut in two and allowed to pass out, the cutters thus freeing themselves from obstructions which might otherwise choke or break them.

I also claim placing the bundles or sheaves of grain at right angles to the path of the machine, by means of a second rake (H,) combined with the first, substantially as herein set forth.

I also claim moving or turning the first rake by cords, chains or belts, arranged and operated as described, or in any other substantially similar manner.

I also claim vibrating the second rake (H,) and turning its teeth as herein set forth, whether the devices employed to effect these movements be such as described, or others equivalent thereto.

I also claim changing the frequency of the alternations of the rakes by means of the cones of wheels (3 4 5,) and pinions (3′ 4′ 5′,) or other equivalent device for the purpose of varying the size of the sheaves, as herein set forth.

NELSON PLATT.

No. 6518.—*Improvement in Harness Saddles.*

Having thus described my improved harness saddle, what I claim therein is new, and desire to secure by letters patent, is disconnecting the pads from the skirts and girth when the pads are hinged to and placed far enough beneath the tree to admit of free motion, to conform to the shape and changing positions of the horse's back, without coming into contact with the skirts or girth, which are attached to the tree, as herein set forth.

JOSEPH W. BRIGGS.

No. 6519.—*Improvement in Steam Pipes for Sugar Boiling.*

What I claim as my invention and desire to secure by letters patent, is connecting the two compartments of the main steam pipe of the evaporating tubes of evaporating pans, by means of a series of syphon tubes, which receive the steam from one compartment and discharge it into the lower compartment, whereby I am enabled to obtain a larger amount of heating surface than by any other known plan.

ALFRED STILLMAN.

No. 6520.—*Improvement in Drill Barrows.*

What I claim as my invention and desire to secure by letters patent, is the combination of the upper slide *i*, with the lower (*m*,) the former moving at least twice for one movement of the latter, the two being made and arranged in the manner and for the purpose, as herein set forth.

GEORGE COLBY.

No. 6521.—*Improvements in Machines for Cutting out Felloes.*

What we claim as our invention and desire to secure by letters patent, is the combination of the cutter head and beam C, with the levers G *j*, cross head *k*, moving between upright slides, and attached to the lever *j*, by the connecting rod *l*, iron straps *m*, and oblong plate, screw shaft H, passing through the cross head, and provided with the friction wheel *o*, which is alternately thrown into gear with the friction wheels *f p*, on the upper ends of the shafts F I, by means of the horizontal beam K, pulleys and weights *u v*, and lever *w*, for elevating and depressing the cutter beam and cutters, in the manner and for the purposes herein set forth.

JOSEPH ADAMS.
LEVI ADAMS.
LUTHER HENRY MOORE.

No. 6522.—*Improved Pad Lock.*

What we claim as our invention and desire to secure by letters patent, is the main spring *c*, answering three distinct purposes; viz. throwing out the bow, holding back the bolt proper when unlocked, and forcing it forward in locking, its power increasing during the process of locking and unlocking, while it is perfectly at ease when unlocked; all of which is constructed and operates substantially in the manner herein above described.

CONRAD LIEBRICH.
FRANCIS CHARLES GOFFIN.

No. 6523.—*Improvements in Barrel Machinery.*

What I claim as my invention and desire to secure by letters patent, is—

First. I claim the combination of the revolving dogs (*m*,) the pawls (*n*,) the disengaging levers U, the vibrating feed lever R, and the stops *q q'*, whereby the slab is secured on the carriage, and successive staves sawed from the same slab.

Second. I claim disconnecting the carriage (N,) from the feed gear during its retrograde motion, while the slab is being fed towards the saw (J,) substantially in the manner and for the purpose herein set forth.

Third. I likewise claim the combination of the oscillating saw (J,) with the curved gated case (T,) whereby the stave is securely held during the action of the saw, in the manner and for the purpose herein set forth.

Fourth. I likewise claim the combination of the stave carriage Y, with the spring dogs, and spring hold fast *t*, and stop *v*, whereby the stave is securely held down during the action of the saws, and then thrown from the machine.

Fifth. I also claim the combination of the concave and convex pressure feed rollers (*c' c''*) and the self adjusting spring clamps or rests (K' K'',) with the concave and convex cutters (A' A'',) when the several members are arranged in the curve of the longitudinal section of the stave, as herein set forth.

REUBEN MURDOCK.

No. 6524.—*Improvements in Trucks for Railroad Cars.*

In order the better to be understood, I have described some things in connection with my improvement, which I do not claim as my invention; but that which I do claim and wish to secure by letters patent, is the connecting and combining in the carriage for carrying burdens and passengers upon railroads, one or more intermediate pair of cylindrical wheels, or wheels nearly

cylindrical, without flanges, loose upon their axles, or otherwise independent in their action, so that any one of these intermediate wheels may revolve faster or slower than the others, in connection with guide wheels having either one or two flanges, they being made fast to their axles, and also either for a six or eight wheel car, all the wheels of the same carriage, both fast and loose on their axles, being attached to one and the same stiff frame, by means of springs and bearing boxes, or otherwise. This combination in a railroad carriage, as above described, I claim as new and of my invention. I do not however claim cylindrical wheels on separate frames, made fast to and revolving with their axles, these having been used in steam locomotive engines as drivers; but I do claim the loose or independent wheels without flanges, in connection with guide wheels, having flanges, and the attachment of the wheel to the one stiff frame, as above described.

ISAAC KNIGHT.

No. 6525.—*Improved Construction of the Master Wheel of Horse Power.*

I do not claim making a cog wheel of segments, as this has been heretofore done in various machines; but what I do claim as my invention and desire to secure by letters patent, is making the rim of the master wheel of a horse power within which the horse walks, of annular segments (*d*,) of cast iron, (the cogs being vertical and on the edge of the segment,) the inner and outer peripheries, of which are grooved and have segmental bands of wrought iron (*e e'*,) fitted therein; the wrought iron segments breaking joint with each other and with the cogged segments, and the whole being bound together by through bolts; thus making a portable rim wheel sufficiently strong and rigid to maintain its form, and perform its duty without the assistance of framing.

JOHN A. TAPLIN.

No. 6526. — *Improvement in Corn Shellers.*

Having thus fully described my improvements, what I claim therein as new and for which I desire to secure letters patent, is the employment of *concave* runner, by means of which the cobs are more freely discharged, armed with spiral rows of teeth or ribs, combined with the inclined breast beam and spring block, substantially in the manner and for the purpose set forth in the preamble and specification.

JACOB MUMMA.

No. 6527.—*Improvement in Churns.*

Having thus fully described my improved churn, what I claim as new and desire to secure by letters patent, is making the moving parts of the churn, consisting of a *vertical shaft and rotary dasher*, constructed substantially as above specified, to be suspended and combined with the moveable lid B, as above described, thereby dispensing with a pivot or step at the lower end of shaft, for the purposes set forth, so that said moving parts can be readily lifted from the churn and again be replaced; the whole operating in the manner above described.

CHAPMAN WARNER.

No. 6528.—*Improvement in Musical Notation.*

Having thus described my improved notation, what I claim therein as new and desire to secure by letters patent, is —

First. The arrangement of distinct characters to denote the fingering of music, made and arranged substantially in the manner herein described.

Second. Giving the twelve musical intervals distinct names, so that the use of the words flat and sharp is entirely avoided, and with them all the confusion naturally arising in the mind of a beginner.

Third. Representing the sounds usually called natural by one uniform color, and those commonly called flats and sharps by another uniform color, so that they may be distinguished from each other by a mere inspection of the musical character representing the note, without the use of chromatic signatures.

ERNEST VON HEERINGEN.

No. 6529.—*Improvement in Inhalers or Lung Protectors.*

What I claim as my invention and desire to secure by letters patent, is—

First. I claim the nose or mouth joint having the piece I, made to fit the nostrils or the mouth, in combination with the valves A and B, for the purpose of causing the air to enter and be discharged through separate orifices, as herein described.

Second. In combination with the said nose or mouth joint and valves, I claim the filterer D, either with or without the tube E, as described.

LEWIS PHECTIC HASLETT.

No. 6530.—*Improvement in Cooking Stoves.*

I wish it to be distinctly understood that I do not limit myself to the application of this method of lining and protecting plates to the shifting plates used in the tops of stoves, but that the same may be applied to the tops of stoves when made in any other way.

What I claim as my invention and desire to secure by letters patent, is the method, substantially as described, of equalizing the heat in the oven by combining with the diving flue at the back and the series of tubular flues at the bottom, with spaces between them, the return flue below the flue tubes, and the return flue at the back of the diving flue, substantially as described.

And I also claim the method of protecting the top plate of the stove or the parts thereof, by lining it or them with a perforated plate or plates, with some earthy cement or other refractory substance interposed between the plate or plates and the perforated lining, as described.

JORDAN L. MOTT.

No. 6531.—*Improvement in Reed Musical Instruments.*

What we claim as our invention and desire to secure by letters patent, is the converting the wind chest (B,) in which the reeds *m*, are located into an expansible sounding chamber by forming one side of it (the said wind chest) of a thin elastic sounding board (*c*,) placed in sufficiently near proximity to the reeds—when this arrangement is combined with the location of the valves on the outside of the wind chest or sounding chamber, substantially in the manner and for the purpose herein set forth.

B. T. BLODGET.
H. B. HORTON.

No. 6532.—*Improvement in Washing Machines.*

I do not limit myself to the materials, dimensions nor proportions set forth in these specifications and drawings of the machine in its various parts, but claim as my invention and desire to secure by letters patent, the combination

and arrangement of the front part of the box with its vertical flutings K, and of the vibrating fluted roller N, and pounders I J, for the purpose of turning the clothes, with the supports as described and represented herein.

DANIEL L. WALKER.

No. 6533.—*Improved Sculling Propeller.*

What I claim as my invention and desire to secure by letters patent, is the propeller *d*, suspended by and in combination with the shafts *a*, *a*, the levers *b*, *b*, and the shaft *c*, *c*, constructed and moving, (see figure 4,) substantially in the manner described and for the purpose herein above set forth.

ALEXANDER BOND.

No. 6534.—*Improvement in Cooking Stoves.*

I lay no claim to the extending of an oven space around a fire pot or chamber of combustion, so that the heat from the whole or any part or portions of the external sides of said fire pot or chamber may be communicated to the air within the oven; nor do I claim to so connect the oven by air pipes or otherwise, with a space around the fire pot or chamber, and having contrivances to admit cold air from without, that air which may pass into and be heated within said space may be conveyed into the oven; nor do I claim the invention of carrying the smoke and volatile products of combustion from the fire place or fire pot over, around, or against the whole or any part or portion of an oven; but what I do claim as my invention, is the herein above explained combination of the oven with the air space *e*, *f*, *g*, and fire chamber, by means of the sliding doors, as specified; the same being for the purpose of either enabling a person to make use of the oven either for baking or roasting, as specified, or to make use of it for baking while the roasting is done, in a roasting apparatus set up against the opening *k*, as herein before explained.

EBENEZER F. MARTIN.

No. 6535.—*Improved Gold Washer.*

I claim, in combination with the mercury bath, a surrounding channel or groove N, made to communicate therewith by a passage *h*, and applied so as to intercept the mercury which may be thrown out from the bath, whereby the mercury thrown out is again returned to the central cistern, without intervention on the part of the operator.

And, in combination with the elements above claimed, I claim one or more concentric mercurial rings, arranged between it and the cistern or bath A, the same not being made to communicate with the main vessel or bath by any passage, the same being for the purpose of intercepting the small escaped particles of mercury, and retaining them until so washed by the water that they will coalesce with the mercury contained in said ring or rings.

And I claim the central tube H, as well as its perforated water diffuser or tunnel I, in combination with the main hollow shaft, its bell mouth vessel or top, and perforated partition or separator G, the whole being made to diffuse and apply the water to the auriferous earth and mercury bath, and prevent packing of it within the tube C, essentially as specified.

WILLIAM BALL.

No. 6536.—*Improvement in Grain Drills.*

What I claim as my invention and desire to secure by letters patent, is the manner of connecting the planting tubes to the axle and seed box, substantially as herein represented and described, by which the person following after and attending the machine is at all times enabled to witness its operation, and see that each tube deposites its proper quantity of grain, or seeds in the drills, to wit: making use of pairs of parallel inclined bars, connected by hinge joints to the tubes and to the axle and seed box, with a groove formed in the lower bar of each pair, for conducting the grain or seeds from the seed box into the planting tube to which it is jointed.

AARON PALMER.

No. 6537.—*Rotating Tumbler Gun Lock.*

What I claim as new and desire to secure in letters patent, is the revolving tumbler A, having a continuous rotating forward movement, by which the hammer B, is raised and allowed to escape, through the intervention of a series of notches acting as cams on the arm O, of the hammer, substantially as described, and expressly as applied to gun locks. I also claim the said tumbler, as described and shown, in combination with the hammer B, trigger C, catch D, and springs E and F.

THOMAS W. HARVEY.

No. 6538.—*Improvement in Churns.*

We disclaim all right to the original invention of the churn; what we claim as our improvement and desire to secure by letters patent, is the introduction of the double inclined stops, as above described.

GEORGE E. GILL.
J. B. TILLINGHAST.

No. 6539.—*Improvement in Carding Machines.*

Having thus described fully my improved machine, what I claim therein as new and for which I desire to secure letters patent, is banding the top rollers or workers to the main carding cylinder, substantially in the manner and for the purposes set forth.

JOHN M'CARTY.

No. 6540.—*Improvement in Grain Carriers for Harvesting Machines.*

Having thus fully described our improvements and the mode of operation, what we claim therein as new and for which we desire to secure letters patent, is the employment, in combination, of a double series of endless bands *e*, *e*, and *f*, *f*, constructed and arranged substantially in the manner and for the purpose set forth, by which the grain is raked and carried over one side of the machine, as described.

And, lastly, we clain the receiver *m*, for collecting the grain into bundles, and discharging it from the machine at once, in the manner herein above made known.

JACOB J. MANN.
H. F. MANN.

No. 6541.—*Improvement in revolving horizontal Coal Grates.*

I do not claim a revolving grate combined with an external stationary case. All that I claim is:

First. The combination and arrangement of the four segmental hinged and sliding doors F, with the revolving grate B, constructed, arranged, and operated in the manner and for the purpose herein set forth.

Second. I claim the combination of the damper L, with the revolving grate, as described.

Third. I claim the combination of the protuberance N, on the inside of the case and doors of the grate for closing the right hand doors as the grate is revolved.

Fourth. I claim the combination of the double inclined plane M, with the case, and the projections on the doors of the grate for bolting the doors as the grate is turned.

Fifth. I claim making the journals G, of the doors with shoulders, g^1 g^2, on the upper and inner sides, by reducing the diameter of the journals in the manner and for the purpose described.

JOHN F. WEISHAMPEL.

No. 6542.—*Improvement in Seed Planters.*

Having thus described the construction and operation of my improved seed drill and planting machine, what I claim therein as new, and desire to secure by letters patent, is the combination of the teeth *z*, hinged at *y* on joint pins, with the beams C, and springs *x*, substantially as described, whereby any of the teeth may turn aside or rise over stones and other common obstructions which they may meet; thus greatly diminishing the danger of being broken, and of throwing the machine out of its track.

EMANUEL MYERS.

No. 6543.—*Improvement in Melodeons.*

I claim my improved manner of arranging the reed with respect to the air passage, or opening *n*, the same being represented in figure 4, and consisting in bending the thin end of the reed down below the bottom of the opening, substantially in manner and so as to allow the air to operate on it as explained.

CHARLES AUSTIN.

No. 6544.—*Improvement in Atmospheric Churns.*

What I claim as my invention, and desire to secure by letters patent, is, the tubulated disk dasher E, surmounted by a hollow stem for churning cream by agitating and by admixing therewith atmospheric air, and the gathering the butter, when separated, into large balls or rolls, as herein set forth.

SAMUEL P. FRANCISCO.

No. 6545.—*Improvement in Winnowing Machines.*

What I claim as my invention is, the trunk F, gradually enlarged from below upwards, and communicating with the atmospheric current through the screen H, in combination with the hopper E', and the fan placed at the end of the opposite vertical trunk D, to separate the chaff and other impurities from the grain, in the manner substantially as herein described.

B. D. SANDERS.

No. 6546.—*Improvement in self-regulating Dampers for Stoves.*

Having thus fully described my improvement, what I claim therein as new, and for which I desire to secure letters patent, is the employment of an ex-

panding flexible plate, firmly secured at both ends, in combination with, and acting upon, a pendulum, lever, or valve, regulating the draft, substantially in the manner and for the purpose set forth.

BENSON OWEN.

No. 6547.—*Improvement in Cooking Stoves.*

Having thus fully described my improved summer and winter cooking stove, what I claim as my invention, and desire to secure by letters patent, is the surrounding the oven with flue spaces, when the said flue spaces are arranged and combined with each other, and with the fire chamber and smoke pipe, by means of dampers (B C,) in the manner and for the purpose substantially as herein represented and described.

ROSWELL WILSON.

No. 6548.—*Improved Lever to be placed on a railroad track, and acted upon by the wheels of cars or locomotives.*

I wish it distinctly understood that I claim no part of the wheels, signals, or turnouts, as my invention; these only show its application. What I claim as my invention, and desire to secure by letters patent, is the joint lever A, constructed and operating substantially as herein described, and applied on railroads for the purpose of giving signals and regulating turnouts.

J. W. HOFFMAN.

No. 6549.—*Improved Door-Holder.*

What I claim as my invention, and desire to secure by letters patent, is the method of constructing turnbuckles or fastenings for shutters and doors of all kinds, by attaching a plug or knob to the back of the shutter or door, the same fitting or passing into the cavity of a cup-shaped vessel through an aperture in a disc of India rubber, or other elastic substance, the said rubber being so regulated as to grasp the knob and keep the door or shutter back, substantially as described.

EDMUND MORRIS.

No. 6550.—*Improvement in Drying Grain.*

What I claim as my invention, and desire to secure by letters patent, is the drying a *mass* of corn, or grain, or malt, or white lead, or flour, or meal, or similar substances, in a receptacle for the substance to be dried, having the air chamber placed within the receptacle, and under the mass or bulk of the corn, grain, flour, white lead, or other similar substance to be dried, and connected with a blowing or exhausting apparatus of sufficient power to drive or draw the air through and around the substances to be operated on, in the manner herein specified, or in any similar manner.

JOS. H. PATTEN.

No. 6551.—*Improvement in Harness adapted to Horse Rakes.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the hanging straps M N, (or contrivances which hold up the thills) so that they may bear on the rump and hips of the horse, instead of on his back, at or near his shoulders in the usual way; and in combination with such an arrangement, I claim to make the short and flaring thills C D, made and applied to the rake head as above specified. I also claim the mode of arranging the tug straps O P, and their rear connections, that is, the arrang-

ing them obliquely with respect to the horse, and connecting them to the braces or rake head, as specified.

WARREN PARKER.

No. 6552.—*Improvement in Seats for Railroad Cars.*

What I claim as my invention and improvement, and desire to secure by letters patent, is the horizontal rod (*e*,) attached to the frame of the seat, in combination with the fixed standards (*b b'*,) when constructed and operating in the manner set forth herein.

AMOS W. SNOW.

No. 6553.—*Improvement in Hill-side Ploughs.*

I repeat that I claim as my invention the extension of the mould board, as above described, and the arrangement of the mould board so as to make it and the land side revolve together, and enable either the upper or lower edge to act as a share, and to throw the soil upon either side of the ploughman. I also claim as my invention, in combination with the above, the arrangement of the iron rod C D, and the iron bars L M, and its arm G H, so as to secure the mould board in a firm position when used. I also claim as my invention, the constructing of a three-sided land side, which is not fastened permanently to the wood work, but acts independently thereof, as herein specified and represented.

DANIEL ROBB.

No. 6554.—*Improved adjustable platform Animal Trap.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the spring spiked frame (F,) and adjustable platform (E,) made, arranged and connected in the manner and for the purpose herein set forth.

I likewise claim the combination of the hinged platform (E,) with the counterpoise (L,) for adjusting the platform so as to make the trap go off with more or less force, thus adapting it to animals of different sizes.

JAMES THOMAS.

No. 6555.—*Improvements in the Rotating Permutation Plate Lock.*

What I claim as my invention, and desire to secure by letters patent, is locking the indices to the permutation plates when the tumbler is thrown up to lock the bolt by means of the flanges, or other equivalent on the tumbler, substantially as herein described, to prevent the possibility of changing the permutation after the bolt has been locked, as described, when the lock is so arranged that the relation between the dials and permutation plates may be changed without opening the lock case, as described.

HENRY RITCHIE.

No. 6556.—*Improvement in Churns.*

I do not intend to limit myself to the particular number or proportions of the parts of which the agitator is composed, nor to the uses to which it may be applied; nor shall I limit myself to the use of any particular description of material in constructing the agitator.

What I claim as my invention and desire to secure by letters patent, is the series of floats or beaters (*a a a*,) formed and arranged as above described,

so as by their thick inclined rear edges they shall, when their motion is reversed, gather the butter in towards the centre, and collect it there, substantially as above set forth. Z. C. ROBBINS.

No. 6557.—*Improvement in Extension Tables.*

What I claim as my invention and desire to secure by letters patent, is first, the combination of the projecting pin *a*, and the groove *a'*, with the series of jointed levers, whereby the two ends of the tables are caused to recede from and approach each other in right lines, which ensures at all times the accurate meeting and jointing of the moveable and stationary leaves.

The manner of extending or contracting the table, and holding it in any given position by means of the combination of the turning rack F, and pinion *e*, with the slotted lever *f*, and catcher *g*, arranged and operated substantially as herein set forth.

The combination of the semicircular collets *m*, with the groove *n*, in the joint pin, for the purpose of securing the latter in place, and forming a bearing for its neck to turn in.

THOS. P. SHERBORNE.

No. 6558.—*Improvement in Instruments for Teaching Music with the Piano Forte.*

What I claim as my invention and desire to secure by letters patent, is—

First. The method of exercising and training the fingers of those who are learning to perform on the piano forte, by springs, weights, or other equivalent device, arranged as herein set forth, or in any other substantially similar manner.

Second. I claim the application to the piano forte of an adjustable rod with pins, sharp points, or any other equivalent device, attached to its upper surface, for the purpose of causing the wrists of the performer to be duly elevated.

Third. I claim the manner of teaching pupils to move their fingers, hands and arms below the elbow, parallel to the keys of the instrument, whether playing the first, last, or middle octaves, by confining the wrists to blocks which slide on a rod parallel to the front of the instruments, and adjustable to suit different performers, or any other analogous device by which similar results are produced. E. VON HEERINGEN.

No. 6559.—*Improvement in Spark Arresters.*

What I claim as my invention and desire to secure by letters patent, is—

First. The deflecting and reverberating cap and the chimney in combination with the first series of inclined or curved shutes, below the top of the chimney, substantially as described.

Second. I claim the perforated diaphragm below the shutes in combination with the inclined shutes and cap, substantially as described.

Third. I claim the second series of inclined or curved shutes in combination with the first series of shutes, the cap and the chimney, substantially as described.

And finally, I claim the surrounding apertures leading into a receptacle for sparks, in combination with the two reversed series of inclined shutes, substantially as described. JAMES A. CUTTING.

No. 6560.—*Improvement in Harvesters.*

What I claim as my invention and desire to secure by letters patent, is arranging a series of inclined knives (*b*,) diagonally across the spaces between the fingers (*a*,) the front end of the cutting edge of one knife projecting beyond the rear end of the cutting edge of the one next succeeding it, substantially as herein described, and acting in combination with revolving spiral cutters (*e*.)

I likewise claim attaching the pole (to whose hinder extremity the team is attached) to the hinder part of the carriage by a pivot (*n*,) in combination with the ropes (*o o'*,) and windlass (O',) by which it is turned, by which arrangement the machine can be turned in a small space and without inconveniencing the team.

PELLS MANNY.

No. 6561.—*Improvement in the Boilers and Water Heaters of Locomotive Engines.*

I claim as my invention and desire to secure by letters patent—

First. The branch exhaust pipe surrounded by a water space combined with the ordinary exhaust pipe, so that a portion or the whole of the steam may be directed through either pipe, the whole being constructed substantially in the manner and for the purpose herein described.

Secondly. I claim the water case surrounding the smoke box into which the supply water is found to be fed into the boiler, by which I effect the double purpose of heating the water by the waste heat before it enters the boiler, and also protect the smoke box from destruction by the intense heat of the flues and cinders.

THATCHER PERKINS.

No. 6562.—*Improvement in the attachment of Harrows to Ploughs.*

What I claim as my invention and desire to secure by letters patent, is attaching the harrow B, to the plough, in the manner herein described and represented; that is to say, attaching the long arm C, at K, anterior to the coulter and the short arm *a*, in the rear of the sheath, in the manner and for the purpose set forth.

JACOB STROOP.

No. 6563.—*Centripetal Press.*

What we claim as new and of our own invention and desire to secure by letters patent of the United States, is the application of a plurality of pressing blocks *g g*, which, with the exception of the bottom and top, enclose on all sides the material to be acted on, and which blocks are so constructed as to allow of their lateral compressing action when moved in the compound direction herein described by a like number of wedges *d d*, or with any analogous or equivalent device through which any competent power can act to force the blocks *g*, with a simultaneous compound and centripetal motion that concentrates the pressure on a plurality of surfaces of material, to give the material a required form or degree of pressure, substantially as described and shown.

JAMES E. SERRELL.
DAVID SMITH.

No. 6564.—*Improvement in Cooking Stoves.*

What we claim as our invention and desire to secure by letters patent, is making the lower flue (*f*,) under the oven elevated at the outsides, formed

between the bottom and the bottom oven plates B and A, as herein described.

WM. E. BLEECKER.
HENRY BLEECKER.
SAM'L D. VOSE.

No. 6565.—*Improvement in Keyed Musical Instruments.*

What we claim as our invention and desire to secure by letters patent, is—

First. The selectors *k*, cords *h i*, and connectors *a g b f*, combined with the valves *v*, and the finger keys of the common key board, substantially in the manner and for the purposes set forth.

Second. The so combining a system of pedals equal in number to the number of keys or scales to be played in, with the mechanism by which each finger key is connected with the valve and pipe of the desired scale, that on putting down the pedal belonging to any scale it shall at once attach to the finger keys usually employed in playing that scale upon the common organ, the valves of the pipes truly belonging to it, the scale, and at the same time raise the pedal that was before down and detach the valves which are not wanted.

Third. The pedals *p*, combined with the pulleys *a a*, and *b b*, and with the selectors *k*, in the manner and for the purpose set forth.

JOSEPH ALLEY.
HENRY W. POOLE.

No. 6566.—*Improved manufacture of Bags and Sacks.*

What I claim, therefore, as my invention, is the producing a new manufacture of bags by weaving together two or more warps above, and two or more below, to form two cloths, when the weft is carried around from the one to the other at one or both sides, to unite the two cloths, substantially as herein described, in combination with the weaving of the two cloths together at given points, to unite them by weaving together all the warps at given distances, for forming the closed sides or ends of bags, substantially as described.

WM. B. CARLOCK.

No. 6567.—*Improvement in Machines for cutting Veneers from cylindrical blocks.*

What I claim as my invention, and desire to secure by letters patent, is the reciprocating saw carriage, in which the saw is operated by a belt from a driving pulley on the main frame, and passing around a guide pulley on the permanent frame, and the guide pulleys on the carriage, substantially as herein described, in combination with the carriage which carries the block to be sawed, and which has an intermittent motion towards the saw, derived from the reciprocating motion of the saw carriage, substantially as herein described.

I also claim the combination of the apparatus for giving the advancing motion of the block towards the saw with the apparatus which gives the rotating feed motion to the block, substantially as herein described; but this I only claim when the two are connected together, and derive their motions one from the other, and when the connection between the two is adjustable to vary their relative motions, substantially as described.

I also claim the combined apparatus for advancing and rotating the block, in combination with the reciprocating saw carriage, by the means substan-

tially as herein described, when the method of operating the carriage is adjustable to various lengths of blocks, and when the said connections between the carriage and the advancing and rotating apparatus are adjustable substantially as described. BENJ'N S. STEDMAN.

No. 6568.—*Improvement in machinery for jointing Staves.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the clamps for holding and presenting the stave, with a turning spindle by means of a hinge, or other turning joint, substantially as described, for the purpose of presenting the two edges of the stave alternately to the action of the shaving wheel without removing it from the clamp, substantially as described. LEWIS S. CHICHESTER.

No. 6569.—*Improvement in Winnowing Machines.*

Having thus fully described the nature, construction, and operation of my invention, what I claim therein as new, and desire to secure by letters patent, is giving rocking, vertical, and longitudinal motions to the lowest or second separating and curved riddle *b'*, and screen *c'*, pendent thereto by means of a mover and guide curved, attached and supported as described, or any equivalent device, operated in an equivalent manner.

Second. I also claim curving the second separating, or lowest riddle *b'*, having its concavity upwards, in the manner and for the purpose described.

Third. I also claim deriving the vertical and vibrating motions given to the feeder *m*, chaff riddle, apron, and first separating riddle from the mover and guide *v*, of the second separating and curved riddle *b'*, and screen *c'*, as described, or in any equivalent way. J. W. FISK.

No. 6570.—*Improvement in Regulators for self-acting Mules.*

Having thus described my invention, that which I claim as new, is the regulator, constructed and made to operate substantially as above described, the same consisting of the combination of the weighted centrifugal lever *e*, the lever pawl, or click *h*, the ratchet wheel *k*, its cam *l*, and the lever *n*, applied together, and to the main driving shaft A, and the slide V, of the twist cam U, essentially as above specified.

And, as auxiliary to the above, I claim the second centrifugal weighted lever *r'*, and the ring *t*, and retractive spring in combination therewith, the same being for the purpose above explained.

EBENEZER C. SANGER.

No. 6571.—*Improvement in Windmills.*

What we claim as our invention, and desire to secure by letters patent, is the horizontal expanding and closing sails or wings, as applied for the purpose of propelling machinery by wind or water, in combination with the mode by which they are regulated, as described in the foregoing and shown by the drawings. EMORY GORE.
EMERSON GORE.

No. 6572.—*Improvement in live Spindles and Fliers.*

Having now described the nature and object of our said improvements, together with the mode of carrying the same into practical effect, we would remark, in conclusion, that we are aware that a top-bearing for spindles has been used,

although not in the manner or combination in which we employ it. We do not, therefore, claim the use or employment of a top-bearing except for spindles formed or constructed as above described. But we do claim as our invention the construction and application (to the preparation and spinning of cotton, &c.,) of a live spindle formed in two parts, as above described, and having the flier permanently fixed to the upper part thereof. The upper part of the said spindle being supported in a fixed bearing, and so constructed and arranged as to allow it (when disconnected from the lower part and raised,) to be held at an angle whilst doffing the full bobbin, substantially as described.

WILLIAM MACLARDY.
JOSEPH LEWIS.

No. 6573.—*Machine for Contracting the Circumference of Wrought Iron Bands.*

What I claim as my invention and desire to secure by letters patent, is a machine for contracting by compression, the circumference of every variety of wrought iron bands, wagon tires, &c., and for compressing and shrinking the same, as herein described, thereby dispensing with cutting and welding.

WM. MASSEY.

No. 6574.—*Improvement in Washing Machines.*

What I claim as my invention and desire to secure by letters patent, is the combination of the rockers B, with the dasher E, and grooves G G, in the manner and for the purpose herein described.

THOMAS KING.

No. 6575.—*Improvement in attaching Buckles to Suspenders, &c.*

What I claim as my invention and desire to secure by letters patent, is the method herein described, of attaching buckles, loops, &c., to elastic or other goods, by means of my clasp, which I now particularly use for attaching buckles and loops to springs for vests and pantaloons, using in its construction any metallic plate most suitable for the purpose.

JOHN ABERNETHY.

No. 6576.—*Improvement in Bee Hives.*

I do not claim to be the original inventor of a bee hive in which the bee boxes are surrounded by an external case; but what I do claim, is the mode of forming and closing the entrance for the bees, on opposite sides of the hive, by means of a recessed or grooved lighting or bottom board H, moving in grooves or otherwise, so as to operate in the manner and for the purpose described; the rectangular slides L, having projections at one end, and inserted through openings in opposite sides of the case, and moving in grooves in the lower edges of the front and back of the same, for retaining the bottom board in its place when dropped, to form an entrance, and for horizontally moving back and forth to regulate the space of ingress and egress for the bees.

GEORGE WHEELER.

No. 6577.—*Improvement in Washing Machines.*

Having thus fully described my improved washing machine, what I claim therein as new, and desire to secure by letters patent, is the cleansing of cloths or clothing by the combined action of conducting and pressure rollers, with

forced jets of suds or water, substantially in the manner herein set forth, not intending, however, to limit myself to the precise mechanical arrangement and combination of parts for effecting this object, as herein described and represented, but shall vary the same as I may deem expedient, whilst I attain the same end by substantially the same means.

LEWIS W. COLVER.

No. 6578.—*Rotating Disk, Bolt and Rivet Machine.*

Having fully described my machine, its application, and the contemplated uses and means of using the same for making blank screws and rivets, and heading and nicking screws.

The previous paragraph referring to a lock up, was inadvertently omitted in the original papers, but was added while the papers were pending examination; however, I have concluded that as such part is indispensable to the alternating motion, the claim of such motion is sufficient, without claiming the device by which the disk is stopped, or caused to rest; hence I do not claim such device.

What I claim as my invention and desire to secure by letters patent, is the arranging a set of dies upon a disk, or any equivalent thereto, equidistant from the axis of the disk, and from each other, so that by giving to the disk an intermittent progressive revolving motion, a die may be brought to each of the several places for receiving the several actions of feeding, heading, and discharging simultaneously (while the disk remains at its rest or lock up) and also cuts off a rod at the time of its revolving (or progressive motion) when the disk and dies are combined with any apparatus for heading and discharging rivets, &c.

Second. I claim the combination of a disk of dies, having an intermittent progressive revolving motion, with an apparatus for heading rivets and such like articles, whether the latter be constructed in the precise manner described, or by any equivalent mechanism that will produce a like result.

Third. I claim the combination of a disk of dies, having an intermittent revolving motion, with an apparatus for knocking out or discharging rivets from the dies.

Fourth. I claim any common and well known feeding apparatus, or any equivalent thereto, combined with a heading and discharging apparatus, and a disk of dies having an alternating or intermittent revolving motion, for the purpose of conveying the dies from one position to another, as required, the machinery herein described being applicable and competent to perform the several operations, when fed with wire or rods, as set forth.

Fifth. I claim the use of the several hammers to give several blows upon the same rivet, and for making screws, as well as the planing process of nicking as applied to a revolving disk of dies in combination with the heading, feeding, discharging, and other apparatus and operations of the machine, all of which are herein before described and set forth.

JACOB G. DAY.

No. 6579.—*Improvements in Machinery for picking Waste.*

I do not claim as my invention, the use of rollers or cylinders, with points or cutters affixed thereon, for the purpose of reducing woollen, cotton or other material into fragments; but I do claim—

First. The shape and form of the pickers used in my machine, as above described, as being peculiarly calculated to separate the threads of the material

subjected to them, without injuring them and breaking their fibres to such an extent that they become unfit for carding and spinning.

Second. The combination and arrangement of the whole machine with the relative action of the cylinder and roller and whipper, to and upon each other, by which the material passing through the first feed roller is by its relative rate of motion compared with that of the larger cylinder, and also the relative arrangement of the teeth of the rollers, steadily and properly fed to the action of the pickers of the large cylinders, and at the same time held firmly to ensure the due action of the pickers, and by which also the second roller is made to seize the unfinished fragments that may be dropped from the first roller, and subjects them to the action of the pickers, in a similar manner to the operation of the first rollers, so that the whole substance of the supplied material is thoroughly picked into long fibres and prepared for carding and spinning into thread.

Third. I claim as my improvement in waste picking machines, the application of picker cylinders, constructed and arranged to operate together, substantially as herein set forth and described, having teeth made in the manner and form set forth. JOSHUA BAILEY.

No. 6580.—*Improvement in Circular Saw Mills.*

I do not claim making the saw plate in sections placed close together and attached to the periphery of a head or collar, as that has heretofore been done in saws for veneers and other analogous purposes.

First. But what I do claim as my invention, and for which I solicit letters patent, is making the plate of the saw in sections, whose inner angle rests upon the shaft, and is secured to the rings and collar, substantially in the manner described, the radial edges of adjacent sections being separated from each other far enough to admit of the free expansion of the metal from heat, without meeting, but connected by means which do not prevent this expansion, whereby the warping or buckling which invariably occur in solid plates, or those whose sections are in contact from partial heating, is effectually prevented, while at the same time the compound sectional plate thus arranged, possesses sufficient strength and firmness for all practical purposes.

Second. I likewise claim the method herein described, of preventing and arresting the vibrations in the saw plate, by causing it to pass between cushions, bristles or other elastic surfaces, arranged as herein described, or in any other substantially similar manner. DAVID PHILIPS.

No. 6581.—*Improved Arrangement of the Sections in a Life-preserving Hammock.*

What I claim as my invention and desire to secure by letters patent, is making the hammock in three tubular sections, whether each section is composed of one or more tubes, each section being provided with an inflating and disinflating tube, so that when the hammock is used as a life-preserver, that the centre section may be disinflated, in whole or in part, thus forming a boat and retaining the occupant in his position, as herein set forth.

SAM'L J. SEELY.

No. 6582.—*Improvement in Brick Presses.*

Having fully described the character, construction and operation of our rotary brick making and brick compressing machine, we wish it understood that

we do not claim the invention of shafts A and L, cog wheels B and K, trunnel head C, pulleys O and Q, bands P R *b* and *c*, separately; but what we do claim and desire to secure by letters patent, is the combination of the mud box and moulding apparatus, as herein described, consisting of a plunger H, to which a cutter U, is affixed, and connecting therewith the horizontal feeder V, as above fully set forth. We also claim in combination with the above parts, the compressing apparatus adapted to this machine for compressing bricks, and consisting of the press plate M, and press brick lever *q qp*, constructed and operating as above set forth.

WILLIAM B. WALDRAN.
GODFREY HARGITT.

No. 6583.—*Improvement in Mills for Grinding.*

Having thus described the construction and operation of my improved grinding mill, what I claim therein as new and desire to secure by letters patent, is the combination of two or more revolving oscillating cylinders, arranged and operated substantially as herein described, for the purpose of grinding grain and other substances.

I likewise claim the manner herein described of preventing the cylinders and the journals of their axes from becoming unduly heated, by keeping a constant current of air circulating through them by the action of the oblique lips of the radial apertures in their ends, as herein described.

THOS. A. CHANDLER.

No. 6584.—*Spring and Tackle Sash-Stopper.*

What I claim as my invention, and desire to secure by letters patent, is the application of the spiral spring D, and also pulleys E and F, applied and operating substantially as herein described, for raising and lowering window sash in windows.

JOHN W. HOFFMAN.

No. 6585.—*Improvement in Pressing Bonnets.*

I am aware that bonnets have been pressed by machinery and the application of lever power to the iron box containing the heated core upon a hat block turned by a crank axle, and therefore I do not claim this as my invention in this application; but what I do claim as my invention and desire to secure by letters patent, is—

First. The combination of the suspended core box E, constructed as aforesaid, with a smooth steel pressing plate fastened to its under surface, tri-branched pressing bar H, curved suspension and lifting springs F, crane G, adjustive connecting rods L, swivelled bow X, and the adjustive treadle K, constructed, arranged and operated in the manner and for the purpose herein fully set forth.

Second. I also claim constructing the suspended box E, to receive the core S, in the manner and for the purpose herein set forth, irrespective of the parts to which it is suspended and connected.

Third. I also claim the combination of the pressing iron *c*, slotted lever *b*, key *e*, jointed connecting rod *a*, and perforated arm *f*, to which the lever is connected with the table A^1, to which the horizontal perforated arm *f*, is secured, for pressing the tip of the bonnet, whilst on the roller B, of the crank shaft D^2.

C. C. DOW.

No. 6587.—*Improved Window Shutter Fastener.*

Having described in the foregoing specification the manner of constructing, mode of application, and the operation of my invention or improvements, I now explain the nature or that part which I claim, to wit:

I do not claim the fastening or locking of the window sash, when used separately; but what I claim as my invention and desire to secure by letters patent, is the combination of the pin *c*, clasp D, and slide bolt E, arranged, as described, with the sash when fastened, so that the clasp cannot be raised from the pin, nor the sliding bolt from its catch, as long as the sash is fastened, thereby securing the shutters at top and bottom, and entirely preventing their being loosed, by boring through the shutter, as herein described and represented.

JACOB STROOP.

No. 6588.—*Improvement in Portable Cot Bedsteads.*

Having thus fully described the construction and manner of using my portable cot, what I claim as my invention and desire to secure by letters patent, is the construction of a folding cot bedstead, as described; that is to say, the folding legs B, the hinges H, combined with connecting support A, and thumb screws C, C, in the manner and for the purpose set forth.

ABR'M M'DONOUGH.

No. 6589.—*Improvement in the Arrangement and Method of Working the Valves of Auxiliary Engines for Feeding Boilers.*

What I claim as my invention and desire to secure by letters patent, is the combination of the valves *n* and *o*, the cross head *m*, the valve rod P, and the hollow piston rod L, arranged in the manner and for the purpose herein described.

I also claim the mode herein described, of working the valves *n* and *o*, by means of the plate spring *r*.

RUFUS PORTER.

No. 6590.—*Improvement in Machinery for Spinning Cotton.*

What we claim as of our own invention and desire to secure by letters patent, is the continuous and unintermitted spinning of "slack twisted yarns," similar to and of the kind heretofore only spun upon mules and like machines, upon the stationary spinning frame, by passing the said yarn directly from the front roller upon the point of the spindle, without any intervening "guide wire" or "guide," and without changing the relative positions of the rollers and spindles, as set forth and described herein.

CHARLES R. TISDALE.
JAMES KEANE.
THOMAS KEANE.

No. 6591.—*Improvement in Wheat Cleaning Machines.*

Having thus fully described my improvement in the machinery above named, what I claim therein as new and for which I desire to secure letters patent, is the employment of the leather covered cylinder, in combination with the leather covered spring concave, constructed substantially as above described, for removing rat dirt and other substances from wheat, as herein set forth.

DAVID L. EWING.

No. 6592.—*Improvement in Ox-yoke Fastenings.*

I claim the construction of the curved arms, as formed according to the above description, so as to embrace with their front parts the bow, the rear parts being so shaped as to form a thumb and finger piece, by which the grasp of the arms may be released, together with the spring by which the arms are kept closed.

I claim the *pin*, as a whole, with the entire combination of pin proper, arms and spring, as set forth in the above specification.

ANDREW HOTCHKISS.

No. 6593.—*Improvement in Cutting, Crushing and Grinding Vegetables.*

What I claim as my invention, and desire to secure by letters patent, is the adjustability of the cylinder *d*, and its parts, as shown in figure 6, for aiding the feeding, in combination with the cutting and grinding apparatus within said cylinder, as set forth.

LUTHER B. FISHER.

No. 6594.—*Improvement in Lounge and Chair combined.*

What I claim as my invention and desire to secure by letters patent, is the arrangement and combination with each other of the back, side, arms, and forward supports of the arms of the chair for folding up, when the instrument is to be used as a bed.

I also claim the construction and use of the double inclined plane K, K, for the double purpose of a pillow to the lounge, and for a writing desk, as described and represented.

ABNER T. LINIKEN.

No. 6595.—*Method of increasing the effective length and cleansing Boiler Flues.*

Having thus fully described my improvement, I wish it to be understood that I do not claim forming a spiral flue within a steam boiler, as that has already been done; but what I do claim as my invention and for which I desire to secure letters patent, is spiral partitions, forming a spiral flue within the flues of a steam boiler, substantially as described; said thread being affixed to a shaft, independent of the flue, so that it can be made to revolve to scrape the flue and clean it when it gets foul.

ABNER CHAPMAN.

No. 6596.—*Improvement in Pump Valves and their arrangement.*

Having thus described my improved pump and its operation, what I claim as my invention, and desire to secure by letters patent, is connecting the valve, substantially in the manner and for the purpose herein set forth.

I also claim making the wings of valves of a spiral or screw form, substantially in the manner and for the purpose herein set forth.

THOMAS THATCHER.

No. 6597.—*Improvement in Winnowing Machines.*

I do not claim as my invention the application of a fan blast to cleanse grain; but what I do claim as my invention, and desire to secure by letters

patent, is the combination of a wind chest D, and adjustable register E, with a separating box B, substantially in the manner and for the purpose herein set forth.

ABRAHAM STRAUB.

No. 6598.—*Improvement in Smut Machines.*

What we claim as our invention, and desire to secure by letters patent, is:

First. The combination of the beaters I, ribs H, and teeth J, with the circular disc F, constructed, arranged, and operating in the manner and for the purpose herein set forth.

We also claim the combination of the perforated or reticulated curbs let into and surrounding the central air holes of the top and bottom of the stationary cylinder, in combination with said stationary cylinder, made in the manner herein described; said reticulated curbs operating in the manner herein set forth, by which free currents of air are produced through the central openings of the top and bottom of the cylinder to the centre thereof, and thence radially from the cylinder through its sides, carrying off the smut immediately on its being separated from the grain, and before the smut can have time to descend and again become mixed with it, as herein described.

ALBERT BUELL.
THOMAS BROWN.

No. 6599.—*Improvement in Vegetable Cutters.*

Having thus fully described my improved apparatus for cutting vegetables, what I claim therein as new, and for which I desire to secure letters patent, is constructing the hopper in the manner set forth, by means of the combination of inclined arms and spreading sides, in the manner and for the purpose set forth, and combining it with and revolving it over a series of stationary knives, as set forth.

WYLLYS AVERY.

No. 6600.—*Improved Deflector for Spark Arresters.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the stationary hollow trumpet-shaped pendent button D, and stationary curved cap D′, with the dome B′, constructed, arranged, and operating in the manner and for the purpose set forth, by which I am enabled to prevent the escape of the sparks with the smoke; the effect of the steam from the exhaust pipes entering the hollow button being threefold: first, to force the sparks downward by coming in contact with them at the circular passage (*d*;) secondly, to extinguish them; and thirdly, to increase their specific gravity, and thus cause them to fall immediately to the bottom of the cinder box C^3.

SAMUEL SWETT.

No. 6601.—*Improved Whiffletree Hook.*

Having thus fully described the manner in which I construct my improved hook and head or ferule, for the whiffletrees of carriages, what I claim therein as new, and desire to secure by letters patent, is the manner herein set forth of combining the hook with the ferule so as to admit the former to turn round in the latter when the cock-eye or tug is to be inserted or removed; the respective stops and the auxiliary hook being arranged substantially in the manner herein set forth, so as to prevent the acoidental escape of the tug from the hook.

A. N. GRAY.

No. 6602.—*Improvement in Calculating Machines.*

What I claim as my invention and desire to secure by letters patent, is the combination of the slides B B, with the indices E E, and the bars F G, in the manner and for the purposes set forth.

S. S. YOUNG.

No. 6603.— *Improvement in making Elevator Tubes for Lamp Wicks.*

What we claim as our invention and desire to secure by letters patent, is the manner of making the elevators of tubular lamp wicks, by combining a spiral, produced by coiling a band or ribbon of metal into a cylindrical figure, with another band of metal formed into a similar spiral, but so as to leave a spiral slot or opening between its contiguous edges, the one spiral being placed within the other, and the two breaking joints with each other, and united to form a tube spirally grooved or screw shaped either within or without, or both within and without, at the same time, in the manner and for the purposes herein set forth, not intending to limit ourselves to the exact arrangements herein set forth; but to vary them at pleasure, while we attain the same ends by means substantially the same.

ROBERT CORNELIUS.
C. WILHELM.

No. 6604.—*Improvement in Casting Types.*

We do not intend to limit our invention to the casting or founding of any particular form or shape of types, or to the founding or casting of types alone, as it may not only be adapted to the manufacture of types of various shapes, but of various other things or matters usually made from metal or other material when in a melted state.

What we claim as our invention, is a combination of machinery made up of the following elements or their mechanical equivalents, the same consisting of the endless chain and its wheels, the series of mould sections applied thereto, and having moulds made in them essentially as described, one or more plates or walls K L, (having one or more air escape holes *c*, made through them,) and the vessel M, or other suitable substitute, all made to operate together substantially in manner and for the purpose as above specified.

JOHN BACHELDER.
SIMON D. DYER.

No. 6605.—*Improvement in Seed Planters.*

What I claim as my invention and desire to secure by letters patent, is the making use of open inclined conductors J K L, for conveying the grain or seeds from the grain box to the ground, when combined with the series of gates *d d*, and the moveable adjustable side of the grain box, for regulating and governing the discharge of the seeds or grain therefrom, substantially as herein represented and described.

I also claim the manner of arranging and combining the series of reciprocating and vibrating stirrers *b* and *a*, with each other within the grain box, substantially in the manner and for the purpose herein represented and set forth.

I also claim the combination of the reciprocating and vibrating stirrers *b* & *a*, with the continuous discharging aperture in the grain box, and the regula-

ting gates *d d*, connected therewith, and with the series of inclined open seed or grain conductors J K L, substantially in the manner herein set forth.

R. H. SPRINGSTEED.

No. 6606.—*Improvement in Hill-side Ploughs.*

Having thus fully described my invention, what I claim therein as new, and for which I desire to secure letters patent, is constructing a hill-side plough, substantially in the manner described, by making the entire land side stationary, and combining therewith two mould boards revolving on a shaft above said land side, so as to turn a furrow on either side when brought into position by means of a crank or other analogous device near the handles of the plough.

ALLEN ELDRED.

No. 6607.—*Improvement in Sofa Bedsteads.*

What I claim as my invention and desire to secure by letters patent, is the construction of a seat, or bed, placed under the ordinary seat of a sofa, couch, lounge, or any other suitable piece of furniture, which will revolve on suitable pins or pivots A, of wood or metal at each end, working in slots B, as described; said seat or bed, to be hinged to the ordinary seat in such a manner that when the ordinary seat is drawn or lifted forward, the under seat or bed will revolve and come on a level with the ordinary seat, which combined, will form a level and good sized bed.

EDWIN B. BOWDITCH.

No. 6608.—*Improvement in Connecting Hubs with Axles.*

I do not claim as my invention securing the hubs of carriage wheels to their axles by means of a catch or segment collar fitting in a groove of the hub or pipe box, as this has long since been known; but what I do claim as my invention and desire to secure by letters patent, is securing the hub of a carriage wheel to its axle by means of a catch or segment collar fitting in a groove of the hub or pipe box, in combination with the spring connection of the said segment collar, and the pin or other projection passing down below the axle, substantially as described, to admit of disconnecting the collar in lifting up the wheel, as described.

JUNIUS FOSTER.

No. 6609.—*Improvement in Apparatus for unloading Carts, &c.*

What I claim as my invention and desire to secure by letters patent, is the combination of the upper or tilting frame B, with the lower frame A, the latter being either stationary or on wheels. I furthermore claim the central lever *l*, with its check and hook *k*, in combination with the stancheon rod *n*, the cam *o*, and the stancheons *p*, and said lever, check and hook, stancheon-rod, cam and stancheons, in combination with the tilting frame B, being mounted on a stationary frame, as represented in figures 1 and 2, or on wheels, as shown in figure 3; the construction or arrangement, and operation of all of which being substantially in the manner and for the purposes herein above described.

CHARLES DOWNER.

No. 6610.—*Improvement in Metallic Boot Heels.*

I do not claim filling a cased heel for shoes or boots with India rubber, which projects beyond the case, to form an elastic tread, nor the employment

of either India rubber or other springs to give elasticity to the heel, when a metal tread is not used; but what I do claim as my invention and desire to secure by letters patent, is making a metallic tread for the heels of shoes and boots, separate from but secured within the casing of the heel in such a manner that it shall be free to change its position to accommodate itself to the inequalities of the surface of the ground, whereby it wears more evenly, and is less fatiguing to the foot than a rigid heel, in the manner set forth.

PATRICK S. DEVLAN.

No. 6611.—*Improvement in Ploughs.*

Having thus described and represented my construction of plough, what I claim as new and desire to secure by letters patent, is—

First. The manner of forming the bed of a plough, with a socket for the admission of the handles, and securing the mould board to the bed, (A,) by means of the knob (*b*); the one wedge, (*d*,) serving the double purpose of retaining the mould board and lower ends of the handles in place, in the manner described and represented.

Second. I also claim the so constructing the brace C, as to make a firm rest and fastening for the handles, thereby rendering an effectual and simple fastening for the handles of a plough, the whole being arranged substantially as set forth.

JOHN RICH.

No. 6612.—*Improvements in Moveable Breeches for Fire Arms, and the Locks and Appurtenances of the same.*

What I claim as new and desire to secure by letters patent, is forming the breech of a gun, and its breech piece or pin with sectional screws *t* and *t'*, cut therein for the purpose of speedily opening the breech for swabbing, depositing the load, and readily closing it again, when the gun is to be discharged, as herein set forth.

Second. I also claim, in combination with a sectional screw breech piece, the hinged support (G,) the slot (Y,) and lever (L,) whereby the said breech piece is easily moved into and out of place in closing and opening the gun, for the purposes herein set forth.

Third. I also claim forming the gun lock in such a manner that the hammer rod and the percussion rod shall be in separate pieces, laying axially within the same barrel, whereby the coiled main spring is made to urge the hammer rod against the head of the percussion rod to discharge the piece, and the recoil spring on the percussion rod is made immediately to draw back and hold the valve which closes the interior of the lock against access of smoke and gases, as herein set forth.

Fourth. I also claim, in combination with a gun having a dissecting screw breech, the flanged shield, (*s*,) through which the cartridge is made to pass into the chamber over the dissected screw, without danger of being broken by the ends and edges of the threads, as herein set forth.

Fifth. I also claim the perforated point or nipple on the percussion cap, for penetrating the enclosing material of the cartridge, and insuring the discharge of the gunpowder, when the percussion is given in the rear of the cartridge, in the manner herein set forth.

Sixth. I also claim, in combination with a rammer for charging guns at the breech, the projecting central point (*n*,) whereby the cartridge, in being driven to its place in the chamber, is perforated at its base to receive the

point of the percussion cap, herein described, for the purpose of insuring the ignition of the gunpowder, as set forth.

Seventh. I also claim the enlargement (*x*,) near the shoulder (*s*,) of the rammer, whereby the shield, through which the cartridge has been rammed, is made to adhere by friction to the rammer, and to be drawn out of the breech of the gun without requiring a separate operation for taking it out. And I wish it to be understood that in these claims I shall not confine myself to the exact arrangement of parts herein described, but shall vary the same at pleasure, while I attain the same ends by means substantially the same. B. CHAMBERS.

No. 6613.—*Improvement in Machines for Pegging Boots and Shoes.*

What I claim as my invention and desire to secure by letters patent, is the manner herein described of simultaneously punching one or more holes in the leather, and driving pegs into others previously made, by means of the awls and punches, arranged as herein described, or in any other substantially similar manner.

Second. The manner of supplying the pegs to be driven by the punches, by conveying them from the hopper in a channel which turns them from a horizontal to a vertical position, with the points downwards, ready to be driven into the holes punctured in the leather for their reception.

Third. The combination of the guide point *t*, with the set screw *d*, for regulating the distance of the pegs from each other, and from the edge of the sole.

Fourth. The manner of raising the holder by means of a thumb lever, whether arranged and operating as herein described, or in any other substantially similar manner.

Fifth. The combination of the bent lever, connecting rod and pushers, for the purpose of driving the pegs out of the hopper into the channels which convey them to the punch holes.

And, generally, I wish it to be distinctly understood, that I do not intend to limit myself to the precise form and arrangement of parts herein described and claimed, but expressly reserve to myself the right to modify the same in any way that I may deem advisable, so that I do not change the essential character of the invention. JAMES LA DOW.

No. 6614.—*Improvement in equalizing the action of Gearing in Horse Powers.*

What I claim as my invention and desire to secure by letters patent, is equalizing the strain and lessening the force of shocks upon a train of cog wheels, by connecting the wheels with their shafts by springs, substantially as herein set forth. CHARLES CAPLES.

No. 6615.—*Improvement in the process of hardening Metals.*

I do not claim hardening steel or iron by immersing it, in whole or in part, in a current of water, nor do I claim suspending the article to be hardened in air, and causing a jet of water to impinge against it, as these methods are known; but what I do claim, is hardening steel or iron by immersing it below the surface of and in water, and then causing one or more jets to play through the body of the water and against the metal, or part thereof to be hardened. ASA WHEELER.

No. 6616. — *Improvement in the Valves of Rotary Engines.*

Having thus fully described my improved prime mover, what I claim therein as new, and for which I desire to secure letters patent, is the sliding valve, constructed as herein described, with an exhaust port therein, which is stopped by the piston while it is opening the valve, as above set forth.

J. P. ROSS.

No. 6617.—*Improvement in Signal Lanterns.*

What I claim as my invention, and desire to secure by letters patent, is the revolving cylinder of colored and plain glass, arranged in a portable signal lantern, in the manner and for the purpose herein set forth.

GEORGE CALLARD.

No. 6618. — *Improvement in Machines to beat and brush Carpets.*

What I desire to claim as my invention, is the employment of dusters or beaters, as herein described, for dusting or cleansing carpets and other fabrics of the same sort, not wishing however to limit myself to the exact method of employing the power.

WILLIAM PETERS.

No. 6619.—*Improvement in Paring, Coring and Slicing Apples.*

Having thus fully described the construction and also the mode of using my machine, what I claim as my invention and desire to secure by letters patent, are the following particulars:—

First. The arrangement of a segment wheel attached to a shaft, said shaft having a socket with projecting arms for the insertion of the knife handle, said segment wheel meshing into a bevel wheel formed on the driving wheel which said bevel contains a bare space and wide cog for the purposes herein before described, the said shaft having a swinging or vibrating weight attached thereto, for the use above stated.

Second. The arrangement of a sliding corer for coring the apple, and for detaching it from the fork, and the guide for dropping the apple from the coring tube, as described.

Third. A slicing apparatus, with cutters or slicers of tin or steel, of the form and arrangement as herein described, placed under the foundation, and connected with the driving wheel aforesaid, so as to perform the operation of slicing at the same time with that of paring.

Fourth. The arrangement of paring, coring and slicing, combined in the same machine, as described; and I make no other claim.

JULIUS WEED.

No. 6620.—*Improvement in Ploughs.*

Having thus fully described my improvements in the plough, and the construction and connection of the several parts thereof, what I claim as my invention, and for which I solicit letters patent, is—

First. The exclusive use of a mould board composed of two sections or parts J L, the lower section or part J, being secured to the land side by the trapezoidal shaped plate O, and extension or bed A′, upon which it rests, the upper section or part L, being adjustive and joined thereto by projecting pivots L^1 L^3, upon which it turns, and adjusted and secured by means of a hook bar N, fixed to the land side B, the whole being constructed and arranged in the manner described.

I also claim the manner of securing and attaching the land bar I, to the land side, as described and represented.

I likewise claim the combination of the adjustive weed cutter and leveler F, with the land side and adjustive sustaining wheel E, as described.

JESSE WARREN.

No. 6621.—*Improvement in Apparatus for Filtering Water, &c.*

What I claim as my invention and desire to secure by letters patent in my improved apparatus for purifying Mississippi river water, is the combination of the settling chambers and filtering compartments, substantially in the manner herein set forth, to wit; the first settling chamber A, being the reservoir or head, extending under the first filtering compartment, and the remaining settling chambers being nearly in the form of an L, with the vertical portion *p*, of each chamber for the passage of water situated between two filtering compartments (B,) and sufficiently large to admit of easy access for cleansing, and its horizontal portion *n*, extending under one of the said filtering compartments, by which arrangement the water will filtrate upwardly from the reservoir A, through the first filtering compartment B′, and flow thence into the vertical portion *p*, of the next settling chamber, in which it will descend into the horizontal portion *n*, of the same, and thence will ascend through the second filtering compartment, and thus continue its course through the entire series of settling chambers and filtering compartments, till it reaches the pure water reservoir C, at the opposite end of the apparatus; by which combination and arrangement free access can be had to the settling chambers and filtering compartments, for the purpose of cleansing them, substantially as herein set forth.

Not intending by the above claim to cover the general principle of the combination of a series of settling chambers with upwardly filtering compartments, the gist of my invention consisting in such an arrangement and combination of settling chambers and filtering compartments, as will give free access to both of them, for the purpose of cleansing them of foul deposits, substantially as herein set forth.

JUSTIN MULHERN.

No. 6622.—*Improvement in Bee-Hives.*

I do not claim to have invented the use of a screen in any of the forms in which it may have been applied to bee-hives merely, but what I claim and desire to secure by letters patent as my invention, is a sash door with a woven wire screen, in combination with projecting parts of the hive, so constructed as to form a recess or space in front of the hive of sufficient size to accommodate a cluster of bees according to their habits of hanging outside the hive, and so that they may be enclosed and protected, whether outside or inside of the hive, by closing the door at night from the moths, as herein specified.

JOSEPH A. DUGDALE.

No. 6623.—*Improvement in Salting Meats.*

Having thus fully described my invention, I wish it to be distinctly understood that I do not claim any particular form of apparatus, as that can be greatly varied and modified; but what I claim as new and desire to secure by letters patent, is rotating or otherwise moving as described, the flesh of animals while in contact with salt or other substances with which it is de-

sired to impregnate it, thereby accelerating or aiding their incorporation or mixing more readily than can be done by hand.

THOS. DAVISON.

No. 6624.—*Improvement in Gas Lamps.*

I do not claim as my invention a generating tube or vapor burner separately considered, but what I do claim as my invention and improvement in lamps for producing light by burning the vapor or gas generated within itself in the manner of gas burners, and which I desire to secure by letters patent, is—

First. The mode of regulating and extinguishing the light when required, by means of a valve formed by the top of the inner cylinder G, at L, and the end or surface of the button R, attached to the head O, of the outer cylinder M, whether the several parts forming said valve be made and arranged in the manner above described, or other mode substantially the same, by which similar results shall be produced.

Second. I also claim the employment of the safety valve C D E, in combination with the guard plate, constructed substantially as above described.

Third. I likewise claim the use of the guard U, in combination with the combined burner and generator, arranged and operating in the manner and for the purpose above set forth.

Fourth. I also claim combining the generator Q R, burner M O, ring V, and guard U, in a single piece made to ascend and descend simultaneously in the manner and for the purpose substantially as herein set forth.

HORATIO G. SICKEL.

No. 6625.—*Improvement in Argand Burners for Gas Lamps.*

I claim the application of the conductor *g*, and button 3, acting in the centre of an argand burner, to conduct heat to the liquid matter in the wick below, for the purpose of making the argand burner a self-generator of the gas it consumes, substantially in the manner and with the effects described and shown.

JOHN G. WEBB.

No. 6626.—*Improvement in Gas Apparatus.*

What I claim as my invention, is the mode of washing the gas or separating the acid, the same consisting in the employment of a close horizontal vessel, and a current of water made to flow through it, as specified, and passing the gas into one end of the vessel and water, and out at the other end thereof, all essentially as specified.

I also claim the combination of a lime cistern or vessel with either the gas holder or purifyer, in manner and for the purpose as above specified, not meaning to claim the use of lime for abstracting moisture, as the same is a well known absorbent.

ANDREW WALKER, Jr.

No. 6627.—*Improvement in Blocks for Setting Hat Brims.*

I wish it to be distinctly understood that I do not claim the hollow box, nor the heater (fig. 5,) nor the method of heating the machine by the same, that being already in common use; nor do I confine myself to that particular mode of heating, as the same may be accomplished by steam or heated air, it being only necessary to dispense with the slide *f*, and making the machine steam or air tight.

What I do claim as my invention and wish to secure by letters patent, is the combination of the convex surface *a*, and the iron or metallic weight *b*, made concave to fit the convexity of *a*, as represented in figs. 1, 2, 3, and the perspective view. S. BILLINGS.

No. 6628. — *Improvement in securing Hooks and Eyes to Tape and Dresses.*

I do not claim any improvement in the hooks or eyes themselves, whether made of round wire or flattened wire, or flattened after they are bent, excepting only the difference in their shanks, by which they are suitably formed and adapted to be attached to tape, and to the same when so attached as herein before described; and my hooks so adapted and constructed as herein before described, I call tape hooks, and when so attached to the tape, as herein before described, I call the article hook tape or crosha tape.

What I claim as my invention and desire to secure by letters patent, is the oblong loop or eyelet in combination with the hook and eye, so as to fasten them to garments by means of tape, and by me designated the "tape hook," as herein before described, and also the attaching of hooks and eyes to tape, as herein before described, so as to form the article by me designated hook tape. CHS. ATWOOD.

No. 6629.—*Improvement in Pessaries.*

Having thus described my improved stem-pessary, I shall state my claim as follows: What I claim as my invention, and desire to have secured to me by letters patent, is forming a stem-pessary with a shield to fit around the labia, and to which the supporting straps may be connected, substantially in the manner and for the purpose herein above specified.

J. H. ROBINSON.

No. 6630.—*Improvement in Bedstead Fastenings.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the cord and slat bottom and use of pulleys, and the methods of suspending it, and also the method of straining the cord by the ratched windlass. HENRY MILLER.

No. 6631.—*Improvement in Cleansing Bottles.*

What I claim as my invention, and desire to secure by letters patent, is the application of the apparatus substantially herein set forth, for the purpose of cleansing bottles. M. C. CRONK.

No. 6632.—*Arrangement of Weight and Pulley for closing Gates.*

What I claim as my invention, and desire to secure by letters patent, is the application of a swivel pulley for closing a gate when the cord to which the weight is attached is fastened to the gate below the level of the said pulley, whereby it acts not only as a gate closer, but also as a support to prevent the gate from sagging, the whole constructed substantially as herein described.

WILLARD TWITCHELL.

No. 6633.—*Improved method of regulating the contraction of Car Wheels.*

What I claim as my invention and discovery, and desire to secure by letters patent, is the mode of cooling and thereby regulating the contraction of chilled

railroad car and other wheels, and pulleys with solid hubs, by the application or a stream of cold air to the hub, in the manner above described, in combination with the non-conducting case for retarding the cooling of the rim, as herein set forth.

JOHN MURPHY.

No. 6634.—*Machine for making Spiral Springs of Wire.*

What I claim as my invention, and desire to secure by letters patent, is the entire method herein described of making springs of curved character in flat or spiral form, in the manner herein set forth, namely, by forcing the wire by notched toothed wheels, or otherwise, between friction rollers, tubes, or smooth bars, so as to form a wire spring into a curved and spiral form at the same time, by means of varying the tool as described; also, the method herein set forth for varying the size of the curve by moving the operating tool by a cam, inclined plane, or any similar mechanical contrivance.

WILLIAM VAN ANDEN.

No. 6635.—*Improvement in the manufacture of Button Moulds.*

We do not claim any of the separate parts of the machine, as such, nor the use of any of the parts separately as our invention; but what we claim as our invention, and desire to secure by letters patent, is the use of the ratch wheels (*r* and *s*,) rack (*i'*,) and lever (*i*,) or one or more friction rollers, rack, and lever, to produce the feeding motion, when combined with the method of holding the strip, and the alternate vibratory motion of the belts, produced by the operation of the cams, thus constituting a self-acting and self-regulating machine when the whole is constructed, arranged, and combined substantially as herein described.

JOSIAH HAYDEN.
RUFUS HYDE.

No. 6636.—*Eccentric Piano Lock.*

What I claim as my invention, and desire to have secured to me by letters patent, is a piano case or trunk lock, in which the bolt is thrown out and in by an eccentric, substantially as herein above described.

PETER H. NILES.

No. 6637.—*Improvements in Locomotive Spark Arresters and Smoke Conductors.*

I claim, in combination with a deflector (*c*,) for directing downwards the current of sparks in a locomotive chimney, the inverted conical jacket or cullender (D,) when perforated with horizontal holes and each hole furnished with flanges which project upward, within, and downward, on the outside of said jacket, whereby the sparks are directed down into the space between the jacket and the outer case of the chimney, and are prevented from raising upward, as herein set forth.

I also claim, in combination with a horizontal chimney for locomotives, the mouth-piece or inhaler, having two upright partitions meeting in an edge or vertical line at the front, whereby the two parts of a divided current of air are made to pass around the sides of the interior chimney, and to unite beyond the opening which gives exit to the smoke or gases, in such manner as to augment the draught of the horizontal flue, while avoiding the entrance of the air to the vertical part of the chimney.

I also claim, in combination with a horizontal flue for locomotives, the moveable inhaling valves L L, which form the lateral gorges, for the purpose

of creating draught within the horizontal flues, in the manner and for the purposes herein set forth, whereby the amount of draught may be increased or diminished at pleasure, whether the cars move with one or the other end foremost.

J. F. FLAGG.

No. 6638.—*Improvement in Cooking Stoves.*

First. What I claim as my invention and desire to secure by letters patent, is the mode of forming diving flues *l*, at the ends of the oven, and opening and closing the communication through the same, by means of the doors J J, arranged inside the oven, and connected to the outer doors I, by links or hinged plates (*k*,) and the swinging dampers K, operated by said inner doors J, in the manner and for the purpose herein set forth, and in combination with said flues, I claim the upper and lower horizontal flues E F, and back diving flue *g*, for conveying the heat around the oven, and back into the smoke pipe, as indicated by arrows in fig. 1, and herein described.

Second. I also claim the combination of the door H, on the side of the stove, with the box or draw *i*, inserted in a corresponding formed case at the bottom of the stove, for the double purpose of forming a return flue *h*, for the smoke and heat, and a receptacle for soot, &c., cleaned from the flues as described.

NICHOLAS MASON.

No. 6639.—*Improvement in forming and balancing Mill Stones.*

What I claim as my invention and desire to secure by letters patent, is the mode herein described of testing and balancing mill stones by being enabled by the means here described to observe the balance of the stone while the same is in motion, as well as at rest, and at the same time to correct the inaccuracies of its balance during the progress of construction.

I also claim the use of the machine here described, for turning off the exterior of the mill stone in finishing the same, as herein mentioned, in combination with the use of the same machine in testing the balance of the stone, as above set forth, the whole being arranged and combined substantially as herein set forth and described.

EDMUND MUNSON.

No. 6640.—*Reversible Life Boat.*

I do not intend to confine my invention to the precise shape or form of parts as exhibited in the drawings, but mean to vary or change the same in any manner and to any extent, so long as I maintain or preserve in it the same principle or novel feature claimed by me, and which renders my boat of great advantage for the purpose of saving life in cases of shipwreck, or other disaster to which navigable vessels are subject.

What I claim as my invention is the buoyant boat constructed with the opening B, and the moveable platform or floor D, placed within the same, and made to operate therein, substantially in the manner and for the purpose as specified; and as auxiliary thereto, I claim the combination of one or more thwart frames, as constructed, applied to the same, and made to operate in connection with the platform, essentially as described.

GEORGE P. TEWKSBURY.

No. 6641.—*Improvement in Self-acting Cheese Presses.*

Having thus described my invention, I claim the cross head lever E E, constructed with the racks *e e*, as described, in combination with the cheese table D, and the stationary racks B B, by means of the wheels W W, and pinions K K, operated by the pinion J, in the manner herein represented, for the purpose of elevating the cheese table, and the cross head lever, but especially for exerting a continual self-acting pressure upon the cheese, by the space between the cross head and the cheese table decreasing as the cheese is being compressed, substantially as herein represented and described.

IRA CARTER, Jr.

No. 6643.—*Improvement in Road Scrapers.*

What I claim as my invention and desire to secure by letters patent, is the device (consisting of brace rods (*b*,) sliding eye bolts (*c c'*,) connecting rod (*d*,) hand lever (*c*,) and spring catch (*g*,) for changing the angle formed by the share with the line of draught) arranged and operated substantially as herein set forth.

B. M. TOWNSEND.

No. 6644.—*Improvement in Rice Hullers.*

What I claim as my invention and desire to secure by letters patent, is covering the rubbing cylinder and concave or other rubbing surfaces of rice or other grain hullers with vulcanized India rubber, in the manner herein described and set forth.

CHARLES WALKER.

No. 6645.—*Improvement in Machines for Ruling Paper.*

What I claim as my invention, is the expansion belt V, and projection *h*, in combination with the endless apron R, and the machinery for gauging and delivering the sheets of paper thereto, substantially as specified, the said machinery being the endless aprons D and G, and gauge O.

WM. S. WILDER.

No. 6646.—*Improvement in Steam Tables.*

What I claim as my invention and desire to secure by letters patent, is the combination of the hollow top and bottom of the table with the hoop, the same being made and arranged substantially in the manner and for the purpose herein described.

I likewise claim making the hollow top with a recess in its under side, into which to raise the stirrer while the hoop is being withdrawn, in the manner and for the purpose herein set forth.

EDWIN HILLS.

No. 6647.—*Method of uniting Metallic Plates to each other.*

What I claim as my invention and desire to secure by letters patent, is the mode of securing together the extremities of metallic hoop bands, to form hoops or metallic plates, by making angled incisions in the same, and locking the projecting portions of metal between the lines of said incisions into each other, and pressing or hammering them together, so as to form smooth surfaces above and below, in the manner before described.

SAMUEL PRATT.

No. 6648.—*Improvement in the Process of Flouring.*

What I claim as my invention and improvement and desire to secure by letters patent, is the process of re-grinding the offal of wheat, *immediately after* it has passed from the "bolts," and putting it through lower "dusters" or "bolts," and returning the flour to the "cooler," to be re-bolted with the superfine flour, all by a continuous operation, after the manner herein before described, so as to produce three new results. 1st. To get a *greater quantity of superfine flour* out of any given amount of wheat than is now obtained by any known method. 2d. By *exhausting* the *moisture* from the grain to prevent the flour from becoming sour; and, 3dly. To *reduce* the products to *two* kinds, *superfine* flour, and a final residuum or *bran*, increasing the former and decreasing the latter or less valuable product, all as herein fully set forth.

D. P. BONNELL.

No. 6649.—*Improved arrangement of Steam Boiler and Furnace thereof.*

What I claim as my invention and desire to secure by letters patent, is giving the combustion chamber of boilers an inverted conical or pyramidal form, so as to make the area of the upper horizontal section greater than that of the lower, surrounding it with a water casing and with a gas chamber, also of increased capacity at the top, and attaching the several parts to the flat bottom of a boiler which forms the top of the combustion and gas chambers, the water casing and the flat bottomed vessel being connected with each other, and the whole forming one boiler, the several parts of which are arranged substantially in the manner and for the purposes herein set forth.

I likewise claim the injection of a jet or jets of air at the flues or passages which connect the combustion chamber with the gas chamber, for the purpose of igniting the gases and retarding their progressive motion towards the bottom of the gas chamber.

H. BOARDMAN.

No. 6650.—*Improved arrangement of Filters for Steam Boilers.*

I do not, however, intend to limit myself to the use of a series of shifting filters, as the same thing can be accomplished by reversing the arrangement, by means of a series of stationary filters, with the feed pipe and blow-off pipe so arranged with a four or more way-cock or other valves, that the supply and blow-off water can be shifted from one to the other of the series.

Nor do I wish to limit myself to the employment of the construction of filters herein above specified, as other kinds of filters may be substituted, the construction of the filters constituting no part of the invention for which I claim letters patent.

The shifting of the filters or of the direction of the water to the filters may be done either by hand or at given intervals, by being connected with the moving parts of the engine, but I make no claim to this, and, therefore, leave the means and the selection of the mode to the discretion of the constructor.

What I claim as my invention and desire to secure by letters patent, is the combination of a series of filters with the supply or feed pipe of a steam boiler, and *placed at some point* between the supply pump and the boiler,

substantially in the manner and for the purpose specified, whether the series be made to shift to the supply pipe, or *vice versa.*

I also claim the above combination of the series of filters and supply or feed pipe, in combination with the blow-off pipe of steam boilers, for the purpose and in the manner specified, and this I claim whether the series of filters be made to shift to the blow-off pipe, or *vice versa*, as specified.

EDMUND BLUNT.

No. 6651.—*Improvement in Covered Buttons.*

Having thus described my invention, I claim the forming of the button with its two parts, top and bottom, made of wood joined together by appropriate fitting parts in the one to coincide with the other, to secure the textile covering inside, and the shank likewise, in the manner substantially as herein described, or in any other manner substantially the same.

PETER KIRKHAM.

No. 6652.—*Improvement in Meat Cutters.*

I do not claim to be the original inventor of a machine for mincing meat on a horizontal rotating block, by means of oblique knives, having a vertical ascending and descending movement, as this is not new; but what I do claim as my invention and desire to secure by letters patent, is—

First. The use of the vibrating spring lever J, for the purpose and in the manner described and represented.

Second. I claim the use of steam for heating and moistening the cutters, as described.

ALLEN BURDICK.

No. 6653.—*Improvement in Mills for Sawing Ship Timber, &c.*

I have thus described the mode of applying the principle of my invention, which I deem the best, but it will be understood that I do not confine myself to any particular mode, as various changes may be made in the details, without varying the principle or character which distinguishes my improvements from all other things before known.

What I claim as my invention and desire to secure by letters patent, is the mode of turning saws mounted upon stretchers or otherwise, within the saw gates, by means of feathers or ribs, with the arms or parallel motions connected therewith, and operated by keys, as herein before described.

And I also claim the mode of determining the bevels of cuts to be made in my said improved sawing machine, by means of a graduated semicircular board and sliding frame, as herein before described.

J. W. COCHRAN.

No. 6654.—*Improvement in the manufacture of Buttons from Straw-board.*

What I claim as my invention, and desire to secure by letters patent, is the mode or process of preparing the buttons aforesaid for the reception of a smooth coat of varnish, which process consists in removing the roughness from the surface of the buttons, after baking them a second time, by revolving them in a cylinder with linseed or other fixed oil, and again baking them until the said oil becomes dry and hard, and impervious to the varnish, as aforesaid, all substantially in manner and form as above described; which said process is peculiar to the use of straw-board in the manufacture of dead-eye

buttons, and essential in the use of that material; and whereby an equally good button can be afforded at nearly one half the cost of the ordinary paper button heretofore manufactured by me in the method secured to me by letters patent of the United States of September 23d, A. D. 1843.

ELISHA M. POMEROY.

No. 6655.—*Improvement in Fire-proof Safes.*

Having thus described our improved concrete safe, what we claim therein as new, and desire to secure by letters patent, is the manner of joining the interior to the exterior casing by bolts or rivets imbedded in the insulating cement, substantially as herein set forth, whereby it is rendered more capable of resisting the action of fire or external force applied to break it open.

We likewise claim the employment, in chests so joined by bolts, of hydraulic cement as the insulating material for fire-proof safes or chests, it being stronger when concreted than other cements heretofore used for that purpose, and therefore making a safe of superior strength and durability, especially when the same is constructed upon our concrete principle herein described.

EDWARD HALL.
JOSEPH L. HALL.

No. 6656.—*Improvement in Planetariums.*

What I claim as my invention, and desire to secure by letters patent, is as follows: I claim the arrangement of the orbit of each planetary ball, excepting those representing the earth and Mercury, in a vertical plane, in combination with overloading one side or part of said ball in such manner that the action of gravity shall operate to rotate the ball once during each revolution of it about the sun L, or in other words, preserve the parallelism of the axis of the ball throughout its entire revolution; the said improvement enabling me to illustrate the seasons at each of the planets excepting the earth and Mercury.

I also claim the method of applying the lamp so as to illuminate the globe L, the same consisting in arranging the lamp on the outside of the globe, and extending the wick tubes into and through an opening made in the globe, and around its axis of rotation, as specified.

I also claim the arrangement of the inferior planets, and the mechanism for operating them with respect to the sun and the superior planets, and their operating mechanism, the said arrangement enabling me to get the inclined motions of the inferior planets, and by so doing to illustrate the doctrine of the transits. This arrangement consists in placing the machinery by which the inferior planets are moved on the opposite side of the sun L, to that on which the other planets and their operating machinery are disposed. The vertical zodiac is so arranged that the equinoctial points are in a horizontal line, and the solstitial points in a vertical line. The "vernal" equinox being on the left, the "autumnal" falls upon the right.

The ascending node of Mercury is in the last of the sign Taurus, or in that point of the zodiac which is reached by the earth on the ninth or tenth of November. The descending node is of course at the opposite point. The machinery which operates the planet Mercury carries it across the plane of the earth's motion at these points.

I also claim the combination of mechanism by which the annual and diurnal revolutions of the earth S, are produced, and by which the parallelism of

the earth's axis during its annual revolution is preserved, the said machinery consisting of the stationary grooved zodiacal wheel and endless belt thereon, the forked arm e^2, its supporting shaft and rotating mechanism, the pulley x^2, tubular shaft w^2, pinion v^2, gear u^3, cylindrical block t^2, and shaft n^2, pulleys r q^2, and their endless band; the whole being applied to the globe S, and made to operate substantially as specified.

BENJ. O. SWAIN.

No. 6657.—*Improvement in the manufacture of Car Wheels.*

What I claim as my invention is the above described improvement in the manufacture of a wrought-iron wheel for railway carriages, viz: by contracting or compressing the tire and its lips down upon a dove-tailed rim while the tire is heated as specified, whereby the parts are united by a continuous dovetail joint, as explained; thereby avoiding, in the use of such a wheel, many liabilities to accident to which other wrought-iron wheels are subject.

EDWARD FINCH.

No. 6658.—*Combined Sash and inside Shutter Fastener.*

I do not claim to have invented any of the parts employed herein, as separately either is well known; but I do claim as new, and of my own invention, and desire to secure by letters patent, the herein-described method of fastening window sashes and inside shutters by means of two pieces of metal hinged together, or one entire piece, binding the sashes and shutters by the addition of a plate and screw, so that they can only be opened from the inside; the whole constructed and operating substantially as described and shown.

JAMES BELL.

No. 6659.—*Improvement in Treenail Machines.*

Now what I claim as my invention and desire to secure by letters patent, is the combination of the bit with the bit holder and head, and the bits, rod and flange, constructed and operating substantially in the manner and for the purpose herein described.

JOSIAH KIRBY.

No. 6660.—*Improved Self-acting Sash Fastener and Stopper.*

What I claim as my invention and desire to secure by letters patent, is the combination of the case (D,) made as described, with the bolt (A,) also made as described, by which the bolt is made to *self-act* in locking the sash to the window frame—the spiral groove (G,) in the case acting against the cog C, projecting from the periphery of the bolt, to move the latter forward and throw it into the thimble (F,) of the frame, as the bolt is turned by the descent of the outer extremity of the handle (B,) in the arc of a circle—the bolt being again withdrawn from the thimble to unlock the sash, by simply raising the outer end of the handle in the same arc of a circle, as herein fully set forth.

JAMES C. COCHRANE.

No. 6661.—*Improvement in Ice Cream Freezers.*

What I claim as my invention and desire to secure by letters patent, is the location of the tube A, within the body of the freezer, and forming a part of the same, when combined with the ice tube B, descending from and made fast the cover, substantially in the manner and for the purpose herein set forth.

JOHN DECKER.

No. 6662.—*Improved Angular Rotating Tuyere.*

Having thus explained my invention, I claim the tuyere of a square, rectangular, or hexagon form, having edges, and revolving not on an eccentric axis, but a central axis to break off the scale formed by the fire upon the metal by turning round the tuyere, when such tuyere is constructed hollow, and with apertures of different sizes upon its different faces through which the blast is forced; the whole being constructed substantially as herein described.

SAM'L H. CAMP.

No. 6663.—*Combined Piston Breech and Firing Cock Repeating Gun.*

What I specifically claim as new in the above described gun, and desire to secure by letters patent, is the construction of a hollow sliding or piston breech pin which is operated by a lever in loading and securing the charge in the breech of the gun, which breech-pin, in addition to the above characteristic, contains or has attached to it, the main spring firing cock or punch, and firing chamber of the priming.

I also claim the plan of transferring the priming from the fixed magazine to the firing chamber in or by means of the said sliding breech-pin, as above set forth and described.

WALTER HUNT.

No. 6664.—*Improvement in Ink Stands.*

I do not claim as my invention forming ink-stands like the accompanying drawing; what I claim as my invention and desire to secure by letters patent, is forming the top or surface surrounding and partially covering the mouth of the reservoir of the ink-stand, of gum elastic, or other similar soft elastic substance, or composition, substantially in the manner and for the purpose herein described.

ANDREW FIFE.

No. 6665.—*Improvement in Dining Tables.*

I claim in combination with the rotary tablet A, the supporting pier C, and tablet B, the mechanism for elevating, depressing and sustaining the rotary tablet somewhat above the stationary tablet, in manner as above described and for the purpose of preventing plates, dishes or articles which may be placed on the tablet B, from improperly interfering with the movements of the rotating tablet.

Furthermore, I do not claim the invention of making a tablet of a fixed part, and one or more moveable or turning leaves; but what I do claim is the above described manner of constructing and combining the leaves and middle parts of the two tablets, whereby the two leaves on each side of the centre of the table may be simultaneously and together turned down into a vertical position, so as to cause the table to have the advantages usually possessed by a common two leaved table.

JOHN C. NICHOLS.

No. 6666.—*Improvements in Rotating Spike Machines.*

Having thus described my improved machine, what I claim as of my invention is as follows, that is to say, I claim in combination with the moveable gauge and pointing dies, the ducts or passages made in the gauge for the distribution of the water on the dies, as described

I also claim the hopper P', and its slide, in combination with the conductor Q, and its moveable frame R, the whole being made to operate together, substantially as above explained.

EDWIN B. WHITE.

No. 6667—*Improvement in Planing Machines.*

What I claim as my invention and desire to secure by letters patent, is giving to the plane irons in passing over the board a compound motion, one around the axis of their shaft and the other rectilinear reciprocating, substantially as described, by giving to the shaft that carries the face wheel O, a rectilinear reciprocating motion, in combination with a rotary motion in the operation of planing, substantially as described.

REID R. THROCKMORTON.

No. 6668.—*Improvement in Machinery for cutting Screws in Bedsteads.*

What we claim as our invention and desire to secure by letters patent, is the combination of the driver or clearer Q, with the hollow cylinder tap N, for keeping the cutter clear of chips during the operation of cutting the female screw in posts for bedsteads, and for other purposes, substantially as described.

JOSEPH GARSIDE.
HENRY J. BETJEMANN.

No 6669.—*Method of connecting the Hammer with the Cylinder of a Revolving Fire Arm.*

Having thus fully described my improved method of connecting the hammer with the cylinder of a revolving fire arm, what I claim therein as new, and for which I desire to secure letters patent, is the employment of the bevel gear introduced into the lock, substantially in the manner and for the purposes set forth, so that two or more chambers can be employed in the cylinder, and chambers of any desired calibre, by changing the relative proportions of the gear, without changing the motion of the hammer.

EDWIN WESSON.

No. 6670.—*Improvement in Machinery for Dressing Treenails.*

What I claim as my invention and desire to secure by letters patent, is the combination of the cutters *a*, with the enlarging and heading apparatus, viz; the cam *g*, the elevating piece T, with *f*, U and *h*.

JESSE FITZGERALD.

No. 6671.—*Improvement in Sugar Pans.*

What I claim as my invention and desire to secure by letters patent, is connecting the two domes of the evaporating pan, by means of a pipe above the top of the pan, the end of which, in the second dome, is turned down, substantially in the manner and for the purpose described, whether the said pipe be inclined downwards from the first to the second dome, or be horizontal, as described.

ALFRED STILLMAN.

No. 6672.—*Improvement in Fountain Pens.*

What I claim as new and desire to secure by letters patent, is the application of a conical metal point or plug, acting in a conical tube, set eccentrically

with the axis of the main tube, for the three purposes of guiding the ink to the nibs of the pen, of regulating the supply of ink, and for securing the ink in the tube when not in use, substantially as described and shown.

D. O. MACOMBER.

No. 6673.—*Method of working the Air Pump, and using a Condensing as a non-condensing Engine.*

Having thus fully described my improved machinery, what I claim as my invention and for which I desire to secure letters patent is, first, the combination of the air pump with the engine, in the manner set forth, by which I work it more easily, and reduce the number of actions of the valves one half less than can be done in the ordinary way. I also claim the arrangement for converting the engine into a condensing or non-condensing engine, by opening or closing a free vent for the steam from the condensers, as set forth.

R. F. LOPER.

No. 6674.—*Improvement in Bedstead Fastenings.*

I claim the mode of holding in the block of metal D, containing the catches or locks into which the contiguous ends of the rails are locked, whereby the metal has a firm bearing against the wood of the inner corner of the post on whichever rail the strain of the pulling comes, as described and represented.

SIMEON HOVEY.

No. 6675.—*Combined Construction and Operation of the Drill in Rock Drilling Machines.*

What I claim as my invention and desire to secure by letters patent, is giving to a drill having its cutting edges bevelled, as herein described, a compound longitudinal and rotary motion, substantially in the manner and for the purposes herein described, but irrespective of the devices by which said compound motion is produced.

G. N. DOAN.

No. 6676.—*Gold Washer.*

Having thus fully described the construction and operation of the above described machine, what I claim as new and my invention, and desire to secure by letters patent, is the combination of the helical revolving screen with the dashers upon its periphery, and the conical frustum with a screw therein, by which arrangement the larger and smaller particles are separated, and the latter washed at one operation, all of which is arranged substantially in the manner and for the purpose set forth.

MICHAEL ENGLISH.

No. 6677.—*Improvement in Hill-side Ploughs.*

What I claim as my invention and desire to secure by letters patent, is the double or right and left hand mould boards (*a* and *b*,) revolving upon a horizontal shaft (*c*,) placed across the beam (A,) as herein described, using for that purpose, cast or wrought iron, or any other material that will answer the desired purpose.

JOHN W. THURMAN.

No. 6678.—*Improvement in Straw Cutters.*

Having thus described my invention, I claim the combination of the reciprocating arms K K, with the ratchet levers or clicks U and W, in the manner substantially as described, and for the purposes set forth.

LEWIS TUPPER.

No. 6679.—*Improvement in Threshing Machines.*

What I claim as my invention and desire to secure by letters patent, is the employment of adjustable teeth *t*, turning upon pivots *m*, on the concave of threshing machines, substantially in the manner and for the purpose herein described.

his
ABRAM + BLOOM.
mark

No. 6680.—*Improvement in Spinal Supporters.*

I therefore claim as my invention and discovery, (and ask therefor letters patent of the United States,) the combination and arrangement of the steel plates A, B and C, and the bands D and E, combined, as occasion requires, with a band or bands F, all the parts being so formed as to be capable of being united in the manner and for the purposes set forth in this specification, and constituting, when so in union, a machine which gives support to the body when afflicted with any disease which makes such support useful.

HENRY G. DAVIS.

No. 6681.—*Improvement in Chucks.*

What we claim as our invention, and desire to secure by letters patent, is the arrangement and application of two or more geared sectors G, G, G, or toothed wheels V, V, V, with the jaws or pins K, K, K, affixed and meshing into a pinion F, as herein described, in combination with the spur wheel C, and screw E.

JAMES W. MARTIN.
EDWIN PARRY.

No. 6682.—*Improvement in Spring Seat Saddles.*

What I claim as my invention and desire to secure by letters patent, is the combination of the elastic strips (*a*, *a*,) for supporting the seat with the spring (*c*,) contained in the cantle of the saddle tree, substantially in the manner herein set forth.

ROBERT SMITH.

No. 6683.—*Machine for bending the Lips of Wrought Iron Railway Chairs.*

What I claim as my invention, is the combination of the former I, the bending levers or bending apparatus, and the base block for supporting the chair blank; the whole being constructed and made to operate together, essentially in manner and for the purpose herein before specified; the drop hammer being employed in combination with the former I, the base block and bending apparatus, substantially as described.

SAMUEL A. COX.

No. 6684.—*Improvement in Graduating Carpenters' Squares.*

What we claim as our invention, and desire to secure by letters patent, is—

First. The method of spacing or graduating metallic squares or rules with steel types or dies, and with or without figures, in combination with the roller press, suspended in a frame, so that the weight or pressure shall be brought below the centre, and as near the plane of the periphery of the roller as may be consistent with strength to bear the pressure.

Second. The arrangement of the roller, frame and yoke, so as to be raised or lowered by the lever F, all as above specified, and for the purposes herein mentioned.

DENNIS J. GEORGE.
NORMON MILLINGTON.

No. 6685.—*Improvement in Machinery for Jointing Staves.*

What I claim as my invention and desire to secure by letters patent, is combining an oscillating stave carriage (C,) with a reciprocating plane, (B,) in such manner that the former shall be operated by the latter, substantially in the manner herein set forth.

SAMUEL JOBES.

No. 6686.—*Improvement in Spring Mattresses.*

What I claim as my invention and desire to secure by letters patent, is the mode of regulating the elasticity of the mattress, so as to increase or diminish the pressure on any part of the person using it, by the means and for the purposes herein above described. Furthermore, I claim the use of the bolts *g*, and the tubes *i*, substantially in the manner and for the purposes herein above set forth.

PATRICK O'NEIL.

No. 6687.—*Improvement in Bedstead Fastenings.*

What I claim as my invention and desire to secure by letters patent, is the nuts E, for tightening and loosening the hooks C, upon the bars *g*, substantially as herein set forth.

JAMES TAYLOR.

No. 6688.—*Improvement in Axles of Carriages.*

What I claim as my invention, is making the axle concavo-convex, combined with the friction rollers, placed in the concavities thereof, in such a manner that the rollers shall protrude from the under side of the axles downward, and rest upon the boxes in the hub, (the upper side of the said friction rollers are never to come in contact with the concavity of the axles,) having the whole load or burden supported by the rollers, and thereby save a large amount of friction, which occurs in using the common or sliding axles.

JOHN J. FLACK.

No. 6689.—*Improvement in Brakes for Railroad Cars.*

What I claim as my invention in the above described mechanism, is the adjustable chisel H, in its combination with the break tread of each brake, the same being made to operate in manner and for the object above specified.

And I also claim the combination of mechanism for elevating the treads of the brakes from the rails, the same consisting of the shaft Y, the parts u^2 and u^1, constituting the clutch, and the levers, chains, and windlasses connected therewith, the whole being applied together, and made to operate essentially as described.

HORACE T. ROBBINS.

No. 6690.—*Machine for Crushing Ice.*

All or nearly all the parts used herein are in previous use in various ways in other machinery, therefore we do not claim separately any thereof as new or as our invention; but we do claim as new and desire to secure by letters patent, the application of a dental faced crushing side *f*, to a hopper, such face being moveable in a centre eccentric with the body of the machine, such application being made in combination with a cam pointed lever formed as described and shown, when such application and combination is used for the purpose of crushing and pushing out the ice, by the same movement which crushes it, and while crushing presses hardest while the mass of ice is strongest, the whole operating substantially as described and shown.

ALFRED C. HOBBS.
JOHN BROWN.

No. 6691.—*Improvement in Machines for Weaving Harness for Looms.*

What we claim as our invention and desire to secure by letters patent, is the method of making weavers' harness by power machinery, substantially as herein described in article 2 of this specification, and as illustrated in figs. 12 to 21, of the drawings, inclusive, whether the carriage containing the harness frame and the shuttles containing the twine be operated by the combination of mechanism herein described, or any other which may be substantially the same, and by which analogous results are produced.

SIMEON HOLTON, Jr.
WILLIAM R. HARRIS.

No. 6692.—*Improvement in Machines for Cutting Paper.*

Having thus described and represented the construction and operation of my machine for cutting paper, what I claim as new and desire to secure by letters patent, is the combination and arrangement of the guide bar C, slide rest D, and adjustable cutter E, in connection with a press or clamp for securing the paper so cut, in the manner and for the purpose substantially as herein set forth and made known.

ALONZO GILMAN.

No. 6693.—*Improvement in Apparatus for operating Shuttle Boxes for Looms.*

What I claim therefore as my invention and desire to secure by letters patent, is the wheel having apertures (or other devices for holding the studs) arranged in radial lines, or nearly so, and at the same time in circles concentric with the wheel, or nearly so, in combination with the moveable studs, and the shoe, or its equivalent, upon the weighted lever, for raising the shuttle box, and allowing them to fall, substantially as herein set forth.

ANDREW ALLEN.

No. 6694.—*Improvement in Moulds for making Glass Pipes.*

What I claim as my invention and desire to secure by letters patent, is not simply the invention of a mould for blowing glass, but I claim the invention of a mould of the shape above described, open at each end, placed in a horizontal position expressly for blowing uniform glass water pipes.

GEORGE SCOTT.

No. 6695.—*Improvement in Machines for Cutting Welts.*

What I claim as my invention and desire to secure by letters patent, is the application of a gauge or gauges to a skiver, whereby welts for boots and shoes may be formed substantially in the manner herein described; distinctly disclaiming the skiver as my invention.

SAMUEL KEEN, Jr.

No. 6696.—*Improvements in the Eccentric Sash-Fastener.*

What I claim as my invention and desire to secure by letters patent, is the combination of the spring (b,) with the notched cam (C,) whereby the latter is rendered capable of holding the sash where the simple cam would be insufficient, and is also forced to enter the slot for locking the window.

LEWIS B. PAGE.

No. 6697.—*Improvement in Machines for turning Leaves of Books.*

Having thus fully described the nature and operation of our improvement in the machine called the "leaf turner," what we claim as our invention and desire to secure by letters patent, is—

First. The arms b^3, with their fingers b^5, in combination with the lever B, operated by the circular or coiled spring and the slide and cord, in the manner and for the purposes set forth.

Second. The catch plate C, with its graduating screw and the guard attached to the lever, for the purpose of catching the pendents b^6, as described.

Third. In the lever so combined with the catch plate and guard, I claim the joint, guide, and longitudinal spring, for the purpose set forth.

Fourth. The combination of the pillar, washers, rings and pin, to form independent bearings for the several arms, as described.

J. H. SCHOMACKER.
MARTIN KUEMERLE.

No. 6698.—*Method of reversing Re-acting Rotary Engines.*

Having thus explained my invention, I claim the mode of reversing the motion of the engine by a rack passing through the shaft thereof and meshing into a pinion on the revolving nozzles, in the manner substantially as herein described.

C. M. MILES.

No. 6699.—*Improvements in Street-sweeping Machines.*

What I claim as my invention and desire to secure by letters patent, is—

First. Arranging two brush wheels abreast in the same machine, substantially as described and for the purposes herein stated.

Secondly. I claim the articulated inflected sweeping plane, composed of two or more curved or inflected sections attached to the carriage in such man-

ner that each section may have either a transverse, vertical, or undulatory motion, substantially as described, and this I claim, whether such sections be connected to each other as herein described, or irrespective of such attachment.

C. S. BISHOP.

No. 6700.—*Improvement in Cooking Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the moveable back plate *b*, and top plate *d*, containing boiler holes, constructed, arranged, and combined substantially in the manner and for the purposes designated.

DAVID JOHNSTON.

No. 6701.—*Improvement in machines for making Wire Heddles.*

I do dot claim making heddles of pieces of wire doubled around pins and twisted by machinery, as this has been heretofore patented; but what I do claim as my invention, and desire to secure by letters patent, is the before-described mode of making wire heddles from a skein or hank of wire by power machinery, by cutting the wire, as it is fed into the machine, into suitable lengths to form, when doubled, the required heddles, and to drop said wires separately on to a horizontal reciprocating, feeding, and discharging hook-rod, by which each wire is doubled into two strands and drawn into the centre of two revolving cylinders turning in contrary directions, wherein the strands are held by pincers and vibrating teeth forced between them until they are twisted into the form of the required heddle, when the heddle is discharged from the cylinders by the reciprocatory movement of the hook-rod, the movements of the several parts of the machine to effect the aforesaid object being produced by a combination and arrangement of mechanism similar to that herein described and represented, or any other which may be substantially the same, and by which analogous results are produced.

A. J. WILLIAMS.

No. 6702.—*Improvement in Can Hooks.*

Having thus explained my invention, I do not claim the jaw levers B B, united together to form a grapple for holding blocks, &c., to be elevated; but what I claim as new and useful is the combination of the fulcrum bar A, with the jaw levers B B, for the purpose and in the manner substantially described.

GEORGE WEBBER.

No. 6703.—*Improvement in Cotton Gins.*

Having thus described my invention and its operation, what I claim as my invention, and desire to secure by letters patent, is the combination of the toothed cylinder *h*, with the screw cylinder *k*, both having their outer surface formed substantially as described, and working together in the manner and for the purpose above set forth. I am aware that toothed cylinders have heretofore been essayed in connection with grooved rollers, for ginning cotton; but when this has been done the grooves have been made directly around the cylinder, or if spiral, have been arranged in lines so nearly parallel with the axis of the cylinder as to operate like beaters, or to force the bolls so rapidly to the end of the toothed cylinder as to prevent them from being properly ginned. I therefore do not claim the toothed cylinder in combination with such grooved cylinders, but only with those having small spiral grooves around their surfaces, running nearly at right angles to the axis thereof, substantially as herein described.

I am also aware that card cylinders have been used in connection with toothed cylinders to strip off the cotton; but in such cases the advantage of delivering the cotton by a current of air directly through an opening is not attained. And I am also aware that brushes attached to the ends of the arms or fans of blowers have been used in connection with toothed cylinders to brush the cotton therefrom, to be thence passed out through an exit mouth in the case of the blower; but in such cases the cotton, when brushed from the cylinder, is rolled and becomes knobbed on the ends of the brushes, and tends to fall upon the bottom of the case of the blower.

But in my said invention the cards on the ends of the arms or fans *c*, hook the cotton from the toothed cylinder and carry it forward without rolling or knobbing it, or allowing it to drop until it reaches the exit mouth, where it is slipped off the teeth by the current of air and carried through the opening 3, to any convenient receptacle, with the fibres free from rolls and knobs. I therefore also claim the blower constructed with cards on the arms or fans, in combination with the toothed ginning cylinder and exit mouth, substantially as described and for the purpose set forth.

STEPHEN R. PARKHURST.

No. 6704.—*Machine for forming the Eyes of Hinges.*

Having described the machinery by which I manufacture hinges, I now proceed to state my claims as follows:

What I claim as my invention, and desire to secure by letters patent, is the lever A, formed and made to move in a compound direction, essentially in the manner herein described, in combination with the spring slide E, by the joint action of which the eye of the hinge may be turned.

D. W. LYON.

No. 6705.—*Improvement in Jointed Pawls.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the pawl C, with the lever (*e e'*,) resting upon the timber (*a*,) and connected to the post A'; forming a jointed pivot pawl, arranged and operated in the manner and for the purpose set forth, together with the mode of holding down the lever by a rope as aforesaid, as substantially applied to the purposes of a pawl, by which the advantages named are gained.

SAM'L S. WALLEY.

No. 6706.—*Improvement in Straw Cutters.*

What we claim as new and useful, and for which we desire to secure letters patent, is first, the employment of four feeding rollers in the manner herein described, the top hind rollers having spikes on its surface to hold firmly the straws, &c., and the combination of the said four rollers to feed in the straw or stalks with a steady uniform motion, so that the action of the cutter wheel will not arrest the motion of the sheet of stalks, &c., when fed into the knives, however great the speed of the cutter wheel may be.

Second. We claim the cylinder fluted pinion wheels K K, in combination with the upper face cog wheels J J, to allow the top rollers to rise up and slide down when different thicknesses of stalks, &c., are fed into the cutters, this being a superior manner of gearing to accomplish this object, and avoid all breakage of cogs in the wheels, for the purposes set forth.

THOMAS BURREL.
EDWARD BURREL.

No. 6707.—*Improved Machine for Polishing Knives.*

What we claim as our invention and desire to secure by letters patent, is the grinding drum (*b*,) and sieve (*h*,) and polishing surfaces (*a a'*) arranged on one shaft, whereby the several operations of grinding, sifting, and feeding the polishing material, and polishing the cutlery, are simultaneously performed in a simple and convenient manner.

ASA MUNGER.
ROYAL C. TAYLOR.

No. 6708.—*Improvement in Registers for Hot-air Furnaces.*

What I claim as my invention and desire to secure by letters patent, is the combination of the slide piece and the connecting rod or rods, for the opening and closing of hot-air registers and ventilators, the said connecting rod or rods being so joined to the slide piece as to form a joint at the place of connection, the said connecting rod or rods also forming a joint at their point of connection to the valves or arms thereof, causing the end of the rods joined to the valves to move in a circular direction, corresponding to the motion of the valves when moved.

CHAS. F. TUTTLE.

No. 6709.—*Improvement in Parallactic Instrument for Measuring Distances.*

What I claim as my invention and desire to secure by letters patent, is mounting a telescope furnished with a micrometer, upon an axis parallel to its line of collimation, as herein described, whereby the telescope can be made with facility and accuracy to take two parallel positions at the extremes of a given base line, for the purpose of measuring the distance of a remote object by means of the parallactic angle thus obtained, measured by the micrometer.

WM. WURDEMANN.

No. 6710.—*Improvement in Machines for breaking Hides.*

I do not claim breaking and softening hides by passing them between two revolving fluted rollers having straight parallel ribs over their surfaces; but what I do claim as my invention and desire to secure by letters patent, is the before described combination of right and left revolving helical breakers, constructed and operated substantially as above set forth, for breaking or softening hides.

ISAAC S. HERSHEY.

No. 6711.—*Improvement in Atmospheric Churn Dashers.*

What I claim as my invention and desire to secure by letters patent, is the combination of the loose plunger *h*, with the tubular dasher *b*, the same being made, arranged and operated as herein set forth, or in any other substantially similar manner.

WM. M. WRIGHT.

No. 6712.—*Improvement in Cars for Dumping Earth, &c.*

What I claim as my invention and desire to secure by letters patent, is the combination of the rocker and clevices with the double car body, substantially as described, and for the purpose set forth.

MICHAEL BERNEY.

No. 6713.—*Improvement in Horse Powers.*

Having thus fully described my improvements, I wish it understood that I *do not claim* as my invention the direct application of the power from the

master wheel to the line shaft, or pinion of the line shaft, by the employment of two pinions diametrically opposite and matching with the master wheel; but what I do claim as my invention and desire to secure by letters patent, is the combination of the compound wheel K, with the pinions N N, and bevelled cog wheels R R, cogged wheel H, with the propelling pinions F, I, the pinion Q, of the line shaft P, and driving or master wheel A, the whole arranged and operating in the manner above set forth.

WILLIAM WARD.

No. 6714.—*Improvement in Pumps for raising Water.*

What I claim as my invention and desire to secure by letters patent, as an improvement in atmospheric and lifting pumps, is the connexion of the lower valve with the piston, in combination with the trumpet shape of the upper part of the pump chamber, so that when the piston is elevated higher than usual, the water above the piston may return into the well, and the piston rod and both valves be withdrawn from the pump and replaced together when necessary, as herein described.

JOHN B. READ.

No. 6715.—*Improvement in Cooking Ranges.*

What I claim as my invention and desire to secure by letters patent, is the arrangement of the inclined flues E, at the sides of the ovens, and inclined flues F, at the back parts of the same, in combination with the diagonal plates G, and the dampers H, for either causing the heat to pass directly from the fire chamber into the chimney, or over the tops, and down the sides, and after enlarging its volume below, up behind the ovens, as herein set forth.

PHILIP ROLLHAUS.

No. 6716.—*Improvements in Machinery for Dressing Shingles.*

What I claim as my invention is the combination of the following elements;—

1. The inferior or stationary inclined bed E. 2. The elevator K. 3. The stationary plane or knife F. 4. The pressure roller N. 5. The moveable carriage and its ways. 6. The superior or reversed inclined bed Q, having an angular inclination to a horizontal plane of double that of the stationary bed. 7. The plane or knife G. 8. The spring catch bar U. 9. The pressure roller R; the whole being arranged and made to operate together substantially in the manner as above specified.

FRANKLIN JENNEY.

No. 6717.—*Improved Machines for making Brooms.*

What I claim as my invention and desire to secure by letters patent, is the use of two or more sets of jaws (E E',) made and arranged substantially in the manner and for the purpose herein set forth, for compressing the broom brush and holding it on the broom handle during the process of wiring the broom.

JAMES THOMAS.

No. 6718.—*Improvement in Flues for Cooking Stoves.*

I do not claim the division plates (B & C,) or the flues formed by them; what I do claim as my invention and desire to secure by letters patent, is the

reverting chamber D', formed by the angular plate K, and plate H, under the front of the bottom of the oven, as herein set forth, when this is combined with the flues formed by the plates (B & C,) as herein described.

HENRY BLEECKER.

No. 6719.—*Improvement in Cooking Stoves.*

Having thus fully described my improved stove, what I claim therein as new, and for which I desire to secure letters patent, is —

First. The contracted opening in which the fire grate is situated, extending down through the bottom of the stove in part under the grate, and permitting the ovens to be enlarged at that point through which the ashes are discharged and air supplied for combustion, and forming a heated chamber, by which a greater heat is given to the oven quite to the bottom of the stove.

Second. I claim the fire-arch plates with their overhanging projections or ledges, forming diagonal channels so constructed as to prevent clogging with ashes, and admitting air on the sides as set forth.

Third. I claim the combination of the grate and its frame, constructed substantially as described, having an angular depression on the upper surface of the grate, and a segmental curvature on the under side, combined with the fire-arch, as above set forth, and with the connecting bars placed within the ends of the cross bars of the grate to complete the draft.

Fourth. The combination of the air passage *t*, &c., with the centre fire-arch and oven-flues, substantially in the manner and for the purpose herein above described.

WILLIAM WHEELER.

No. 6720.—*Improvement in Cooking Stoves.*

Having thus fully described my improvement in cooking stoves, what I claim therein as new and for which I desire to secure letters patent, is the arrangement and direction of the flue, in combination with a fire chamber the whole size of the top of the stove, the flues forming the first part of the course, being made a part of the walls of said chamber.

WILLIAM SOURS.

No. 6721. — *Improvement in Cooking Stoves.*

Having thus fully described my improvement, what I claim as new and desire to secure by letters patent, is the combination of the flues, substantially as described, so as to cause the draft to pass around the oven the whole breadth on their sides, and thence along side flues, on top to the exit pipe, through the triangular flue in the rear.

I also claim, in combination therewith, the fire-chamber with a grated back, by which I effect an economy of heat by exposing a larger portion of the ignited fuel to the chamber over the oven.

ELIAS KAIGHN.

No. 6722.—*Signal for Privies.*

Having thus explained my invention, I claim the combination of the signal with the bolt of the door of the privy, to operate the signal in the manner set forth, by the bolting and unbolting of the door.

J. H. DOUGHTY.

No. 6723.—*Improved Fire-arm with several Stationary Barrels and a Revolving Hammer.*

What I claim as my invention and desire to secure by letters patent, is a fire-arm with the following essential elements: several fixed barrels and a revolving hammer; the successive discharge of the barrels is effected by the hammer, and the whole is constructed substantially as herein described, but irrespective of the positions of the cones, of the form or position of the hammer, or of the mechanical devices by which the revolution of the hammer is effected or the stroke given.

GEORGE LEONARD, Jr.

No. 6724.—*Improvement in the Land-side of Ploughs.*

Having thus described the construction and operation of my improved plough, what I claim therein as new and desire to secure by letters patent, is diminishing the bearing of the land-side upon the bottom of the furrow, and thus lessening its friction by inclining at least one half of its lower edge on the rear end slightly upwards, but not so abruptly as to prevent it from resting, throughout its entire length, against the land-side of the furrow to sustain the pressure of the furrow slice against the mould-board, and maintain an equal balance of the plough.

ABRAHAM CHRIST.

No. 6725.—*Improvement in Machinery for Riving and Dressing Shingles.*

What I claim as my invention and desire to secure by letters patent, is effecting the several operations of riving the bolt, and shaving and jointing shingles by a single revolving wheel (B,) made and arranged substantially in the manner herein described.

ENOCH R. MORRISON.

No. 6726.—*Improvement in Rotary Churn Dashers.*

I wish it to be distinctly understood that I do not intend to confine myself to the precise construction and arrangement of parts herein described, but contemplate varying the same to any extent which may be deemed expedient.

What I claim as my invention and desire to secure by letters patent, is making the beaters of revolving churn dashers to turn upon their own axes, substantially in the manner and for the purpose herein set forth.

LEWIS W. COLVER.

No. 6727.—*Improvement in Rotary Churn Dashers.*

What I claim as my invention and desire to secure by letters patent, is the combination of the pistons (a',) moved by stationary eccentrics (d',) with the floats (h,) of a revolving dasher, in the manner and for the purpose herein set forth.

D. N. EGBERT.

No. 6728.—*Improvements in Couplings for Cars.*

The capacity of the machine for self-adjustment by the laws of gravitation, and the collateral aid of the spring, if necessary, in its application to railroad cars, the ease and certainty by which a separation can be produced by the lever attached, and the advantage of the immediate disconnection that would

follow in case of an accident, by which one car should be thrown off the track and down an embankment, are important improvements and principles claimed by the inventor.

JOSEPH D. ALVORD.

No. 6729.— *Improvement in Gas Generators.*

What we claim as our invention and desire to secure by letters patent, is so constructing the retort furnace that it can receive the whole charge of fuel required for a single operation, and so managing the combustion of the fuel by setting the controlling dampers that it shall cover the space of time usually allotted to the consumption of the gas by the burners, when this arrangement of furnace and damper is combined with the gas holder that controls the feed to the retort, and supplies the same, according to the consumption of the burners, as set forth and described herein.

JOHN WATSON.
EDWARD CART.

No. 6730.— *Improvements in Couplings for Cars.*

What I claim as my invention and desire to secure by letters patent, is the connecting railroad cars by a joint formed by the combination of the head pieces B, with the cylindrical piece A, the joint being held together by the link and pins C D E, the whole constructed and arranged in the manner above described.

H. L. B. LEWIS.

No. 6731.— *Improvement in Frames for Stretching Canvas.*

What I claim as my invention and desire to secure by letters patent, is the method of constructing the frame without mortise or tenon, by cutting the corners to a mitre and securing them by metallic plates, by means of binding screws, inserted through slots, so that the corners may be forced outward by means of four wedges or keys, when the whole is constructed substantially as herein described.

HENRY BRYANT.

No. 6732.— *Improvements in the Spinning Jack.*

What I claim as my invention and desire to have secured to me by letters patent, is driving the spindle carriage forward and back by means of a mangle wheel on which the teeth are arranged in a circular position, and securing the quick and slow motion of said carriage, by alternately driving the mangle shaft L, with gears Q and R, of equal size, and gears T and V, greater or less disproportioned to each other. I also claim stopping the movement of the carriage when it is out, so that the requisite twist may be put into the yarn, by throwing from time to time the pulley Z (on the main shaft A A, and from which the mangle shaft derives its motion) out of connection with said shaft, by the clutch *t*, operated substantially as herein above described.

I also claim effecting the "backing off" of the yarn from the spindles, or reversing the action of the race belt shaft from time to time, by means of a suspended box or frame N″ containing the self-adjusting studs R″, operated or pressed down by the revolving arm S′ on the shaft L, and having a hook T″, which as said box descends, engages with and turns the ratchet U″, on said race belt shaft, the whole being substantially as herein above described.

I also claim changing or varying the transverse movement of the copping or faller wire, by the double ratchet *h″ j″*, operated as described, the screw

rod f'' f''_1, and chain e'', connected to the shaft b'', which holds the copping wire, the whole being combined, and operating substantially as herein above set forth.

FOSTER NOWELL.

No. 6733.—*Improved Door Lock.*

I do not limit my invention to the precise form or forms of any or all of the parts thereof, but intend to vary the same in any manner and to any extent, so long as I do not substantially change the peculiar parts or combinations claimed as new.

What I claim is one or more concentric depressing tubes *n o p q r*, as combined with the series of tumblers and internal or permanent key K, and made to operate therewith, and by means of the external key, (figure 8,) substantially as herein before described.

I also claim the mode of making the internal key K, viz; with the socket in the shank, and the moveable bitt and spring applied to the said socket, the whole being substantially in manner and for the purpose as above set forth.

I also claim the indented or concentric wheel tube and its gear, or turning mechanism, in combination with the series of (or one or more) concentric depression tubes, and its and their tumblers, substantially in manner and for the purpose as specified, the said wheel tube being constructed with one or more recesses or notches for the reception of the projection of its tumblers, under the circumstances and for the purpose as described.

I also claim the head or socket plate *z*, in combination with the fixed key shank, and the series of concentric depressing tubes, substantially as specified; the same serving to cover and protect the ends of the concentric tubes, and to lock or connect the permanent and moveable keys together, so as to enable the latter to turn the former, all as herein before explained.

EDWIN B. HORN.

No. 6734.—*Improvement in the Motion of Riddles in Winnowing Machines.*

What I claim as my invention and desire to secure by letters patent, is oscillating the shoe diagonally, by means of the bumper, substantially in the manner and for the purpose set forth.

ALEXANDER MOFFITT.

No. 6735.—*Improvement in Paring and Coring Fruit.*

What I claim as my invention and desire to secure by letters patent, is the projecting hollow tube core cutter F, in combination with the lever arm I, in the manner and for the purpose described and represented.

PETER W. HARDWICK.

No. 6736.—*Improvement in Suspender Buckles.*

What I claim as my invention and desire to secure by letters patent, is constructing a buckle or fastener for suspenders and other purposes, of a front plate (B) a spring (A,) with two eyes or places (*d*, *e*,) to hold the tongues or pins, and the tongues or pins (*f*, *g*,) made of one piece, bent to the shape, substantially as shewn in figures 1, 2 and 4, when the whole is arranged, connected and combined, substantially as herein described.

SHELDON S. HARTZHORN.

No. 6737.—*Improved Form of the Air Chamber of Life Boats.*

My invention and that which I claim, consists in the peculiar enlargement or mode of making each of the decks or upper parts of the air chambers at the bow and stern, each being constructed with a reversed inclination or depression toward the nose of the bow or stern, and an elevation of base high above the gunwale, as represented in the drawings, and as differing from the mode heretofore practised, and substantially delineated on said drawings by dotted lines; the said improvement in the bow and stern air chambers enabling me to obtain advantages, as above stated, as well as many others not herein enumerated.

J. DURELL GREEN.

No. 6738.—*Improvement in Cauls for Veneering.*

What I claim as my invention and desire to secure by letters patent, is the method herein described of interposing between the veneer and the screw, or other device by which it is compressed into contact with the surface on which it is required to glue it, a stratum of some elastic substance, thick enough to be readily compressible into the cavities, and to allow the protuberances of the surface to penetrate into its mass, whereby a sufficient pressure is exerted upon every part of the veneer, bringing it into close contact with the surfaces of all the inequalities of the ground, and effectually expressing the surplus glue from between them.

HAZARD KNOWLES.

No. 6739.—*Improvement in the mode of applying Springs in Time Pieces.*

What I claim as my invention and desire to secure by letters patent, is the using of two driving wheels, (A and B,) propelled by two springs, (C and D,) and so arranged as to exert their driving force on opposite sides of the main pinion, (F,) to lessen the friction, to communicate a uniform motion, and to supply an efficient maintaining power, while each spring is being wound up for what is called "eight day marine time pieces," when the whole is constructed and arranged substantially as herein described.

LEVI BEACH.

No. 6740.—*Improvement in Springs for Chairs.*

Having thus fully described the nature of my new and improved spring, what I claim therein as new and desire to secure by letters patent, is the employment of two or more sets of bow shaped or other regular curved leaves, substantially such as herein described, being made of metal of the same thickness and breadth throughout, or nearly so, and firmly attached by their ends or bearings to the boxes or other fixture by which they are held in place, each leaf composing said springs working separate from the others, as above specified, and firmly fastened at their ends or bearings, as applied to chairs and other similar purposes, as described and represented.

THOMAS E. WARREN.

No. 6741.—*Improvement in Dentists' Forceps.*

Having thus explained my invention, I claim the combination of the flexible jaws with the forceps, in the manner substantially described, for the *purpose* set forth.

EDWARD BOURNE.

No. 6742.—*Improvement in Self-acting Cheese Presses.*

I do not claim to be the original inventor of the self-acting cheese press, but what I do claim as my invention and desire to secure by letters patent, is the employment or application of the rollers I, I, in connection with the levers L, L, L, L, the rollers I, I, being suspended between the follower board G, and the cheese board J, by means of the cords H, H, H, H, ropes, chains, or other suitable suspenders, substantially in the manner and for the purpose above set forth, thereby not merely giving pressure to the cheese, but pressing it with a gradually increasing degree of pressure, as the follower board G, the cheese board J, with the cheese between them descend along the standards C, C.

SAMUEL MANN.

No. 6743.—*Improvement in Seed Planters.*

Having thus fully described my improvements, what I claim therein as new and for which I desire to secure letters patent, is —

First. The combination of the carrying wheel (*c*,) and shaft (*e*,) substantially as described, by means of the spur gear and crown wheel, with a lateral motion by which the quantity of seed sown can be exactly regulated.

Secondly. I claim the adjustable gauge for regulating the depth to which the seed shall be sown, and for the other purposes named, covering and depressing the earth over the seeds.

Thirdly. I claim the mode of securing the parallel motion of all the teeth laterally by means of the diagonal braces, all as herein fully set forth.

J. P. ROSS.

No. 6744.—*Improvements in Machinery for Jointing Staves.*

Having thus explained our invention, we claim the combination of the two planes C, C, with the guide rails F, F, and the gauge G, to set the planes at different angles to joint staves of different bulges, the planes answering the purpose of a face plate, and the one plane shaving in one direction and the other shaving in an opposite direction, in the manner described, or in any manner substantially the same.

We also claim the planes C, C, constructed with the faces f^1 & f^2, in each plane, in combination with the supports I, I, on the planes, to shave off the *rough* and smooth, or finish the jointing by one set of planes, in the manner substantially as set forth.

HOSEA BENSON.
LORENZO D. BENSON.

No. 6745.—*Improvement in attaching Hooks and Eyes to Cards.*

I do not claim any peculiar method of cutting the paper, nor any particular kind of machinery for perforating it for the cards.

What I claim as my invention, and desire to secure by letters patent, is the fastening of hooks and eyes to the cards, in the manner set forth, that is, by means of suitable perforations and crimping, folding or doubling of the cards or paper, thereby dispensing with the use of thread and much labor.

CHAS. ATWOOD.

No. 6746.—*Improvement in Shower Baths.*

What I claim as of my own invention and desire to secure by letters patent of the United States, is the manner of arranging the pump, cistern, lamp and steam tube as herein set forth, substantially in the manner and for the purpose described.

JEREMIAH ESSEX.

No. 6747.—*Improvement in making Dissected Maps.*

What we claim as our invention and desire to secure by letters patent, is our mode of making dissected maps, the same consisting in cutting the sections with the grain of the wood by suitably prepared dies; the paper with the inscriptions or representations being pasted upon the wood before the sections are cut; all as above specified and for the purposes herein mentioned.

SAMUEL McCLEARY.
JOHN PIERCE.

No. 6748.—*Apparatus for Opening and Closing Blinds.*

What we claim as our invention and desire to have secured to us by letters patent, is the apparatus herein above described for opening and closing blinds from the interior of the house, without opening the sashes; said apparatus consisting of a horizontal slotted arm fastened to and projecting from the blind, as described, and a lever arm cast on and projecting at right angles from a sliding and turning rod passed through the window frame, as described.

CHENEY REED.
ELIAS HOWE, Jr.

No. 6749.—*Improvement in the construction of Grain Carriers.*

Your petitioners also claim as an improvement to the original machine the following: At the summit of the machine and underneath it, there are placed two rings, through which (in case the wind is blowing) there is placed a pole twelve feet in length, to which is attached a piece of canvas extending diagonally to the floor, so as to protect the fan from the effects of the wind, and enable it to perform its duty.

What we claim as our invention and desire to secure by letters patent, is the mode of constructing the wire belt or straw carrier, as herein described and represented.

ADAM LINHART.
SAM'L McCLAIN.

No. 6750.—*Improvement in Devices for Sowing Seed in Grain Drills.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the springs *h i*, attached to the vibrating bar or plate *g*, to which the anti-friction roller E, is affixed, zig-zag plate or wheel *j*, and vibrating bar D, having teeth *d*, on its upper surface, for facilitating the passage of the seed or grain through the space between the parallel plates C, as described.

PIERPONT SEYMORE.

No. 6751.—*Improved Self-acting Waste-gate or Sluice.*

What I claim as my invention and desire to secure by letters patent, is a waste-gate which revolves on a horizontal axis placed nearer the bottom than

the top of the gate, which is opened and shut by the action of the water, and whose motion is restricted by appropriate stops, the whole constructed and operating substantially as herein described.

AMBROSE TORREY.

No. 6752.—*Improvement in Portable Copying Presses.*

What I claim as my invention and desire to secure by letters patent, is the curved form of the bed and platen plates, as herein before described.

HENRY M. PAINE.

No. 6753.—*Improvement in Machinery for Spinning Flax, &c.*

Having thus described my invention, I claim the balance frame F, constructed substantially as described, and suspended on the axles of the flyer. I also claim the combination of the eccentric G, with the rocker I, the balance frame F, the guide bar J, the regulating bar N, the ratchet lever K, and the ratchet rods M, M, and the ratchet wheel Z, on the spindle which moves the bobbin, to move the said bobbin in the manner substantially as herein described.

CHAS. CLARK.

No. 6754.—*Improvements in Couplings for Cars.*

What I claim as my invention and desire to secure by letters patent, is the combination of a spring tongue (D,) with the self-acting guided coupling pin (E,) arranged substantially in the manner and for the purpose herein set forth.

WARREN D. HATCH.

No. 6755.—*Improvement in varying the speed of the Mandrel in Lathes.*

What I claim as my invention is the combination of gears fixed to the cone of pulleys, and made to revolve with and by them; the two gears G and H, affixed upon a shaft or axle extended or projected from the mandrel, a gear M, affixed on a tubular shaft, through which the mandrel extends, and in which it turns, and the tubular shaft D, the whole being applied to the mandrel and cone of pulleys, and made to operate in connection therewith, substantially in manner and for the purpose as above specified.

WM. A. CHAPIN, Jr.

No. 6756.—*Improvement in Machinery for raising Water from Wells.*

What we claim as our invention and desire to secure by letters patent, is the catching and retaining the sliding plate T, in its proper position whilst a full bucket is being elevated in a well, and detaching the sliding plate at the moment that the bucket is emptied, to allow the position of the plate to be changed, for the purpose of reversing the motion of the buckets, by means of the combination of the lugs *t*, *t'*, projecting from the side of the sliding plate (T,) and the arms *b*, *b'* and *d*, *d'*, projecting from the shafts *a*, *a'*, arranged and operated by the ascent and descent of the buckets, substantially in the manner herein set forth.

We also claim the manner of upsetting the buckets and discharging their contents, by means of rods *g*, that connect the lifting bails of the buckets to the ends of the chain D, and the tilting bails *f*, *f*, combined with the rods *g*, and with the buckets, and operated by the forks *c*, at the ends of the levers *b*, *b'*, substantially as herein set forth.

JEHIAL T. FARRAND.
WILLIAM HINMAN.

No. 6757.—*Improved Composition for Metallic Packing in Steam Engines.*

What I claim as my invention and desire to secure by letters patent, is the application of the composition as above described, for the purpose of packing steam engines. GREEN S. COX.

No. 6758.— *Improvement in Carding Machines.*

What I claim as my invention and desire to secure by letters patent, is the employment of the cylindrical top cards A, in combination with the vibrating strippers E, F, and the main cylinder M, the parts being arranged and operated substantially as herein set forth. DANIEL W. HAYDEN.

No. 6759.— *Improvement in Apparatus for making Mould Candles.*

I am aware that moulds have been adjusted in the frame, by means of a thread or screw cut on the moulds, and that the wicks for whole frames have been supported on wires; I therefore do not claim either of these, as such, as my invention; but what I claim as my invention and desire to secure by letters patent, is the use of the slide G, with the wires E, to sustain the wicks, attached in such a manner that I am able to even and centre the wicks, and when the tallow has cooled, to entirely withdraw the wires from the candles, each by a single motion of the slide (G,) of only about one-half of the diameter of the candle, as herein described.

And I also claim the combination of the use of the mould made with an adjusting thread D, or screw below the end, the shoulder on which the tallow table rests, and a hole *d*, for the wire, with the slide G, and moveable tallow table (fig. 7,) when the whole is constructed and combined, substantially as herein described. ANDREW L. BROWN.

No 6760.—*Process for making Steel.*

We take occasion here to observe, that since our invention, the hot carbonic oxide blast has been applied to some extent, in the manufacture of iron, both in Europe and America, but we have priority and originality in the mode of application, as herein described, of this important gas to the manufacture of steel.

We do not claim to have been the first who have melted iron in a common cupola furnace, charged in the usual manner, and urged by blasts of hot carbonic oxide gas; but what we do claim as our invention and desire to secure by letters patent, is the process herein described, of manufacturing steel, by producing first, a metal imperfectly converted in the cupola furnace, in the manner described, and then submitting said metal to the refinery, constructed as herein described, where the article is perfected by the means above made known; secondly, we claim the horizontal blast in the refining furnace, as above more particularly stated, for blowing a blast of carbonic oxide as herein set forth. NORMAN M. ISHAM.
ERASTUS E. MARCY.

No. 6761.—*Improved Foot Valve of Steam Engines.*

What I claim as my invention and desire to secure by letters patent, is constructing the entry valve of a pump which draws water from a condenser of less specific gravity than water, and arranging it substantially in the manner herein set forth, beneath the valve seat against which it is supported by the water in the valve chest, so that when the pump piston is withdrawn in the

barrel, and the water in the valve chest recedes from the valve, the latter being unsupported, will fall and allow the water in the condenser to flow into the pump through the opening in the valve seat, but when the water fills the valve chest, the valve being lighter than the water, will float upwards and close the opening.

S. W. ROGERS.

No. 6762.—*Improvement in the mode of operating Brakes for Cars.*

I am aware that brake levers have been placed between the trucks of a car, and that a brake lever thus placed has been connected by its fulcrum with the brakes of one truck, and by its working end with the brakes of the other, so that the brakesman can bring both sets down upon the wheels at once, and cause each to act with the same force as if the other was not in operation. I do not, therefore, claim doing merely this, but when this has been done the levers have not been so arranged as to act with equal force upon the wheels of both trucks, nor have they been conveniently arranged for application to such brakes as my arrangement is applied to.

What I claim therefore as my invention and desire to secure by letters patent, is the peculiar manner, herein described, of arranging the levers and connecting rods, in combination with the brakes, so as to apply both sets of brakes with equal force, by working either brake wheel.

NEHEMIAH HODGE.

No. 6763.—*Improved arrangements of the Conductors in Centrifugal Gold Washers.*

And what I claim as of my own invention in the above contrivance, is the arrangement of conductors, (on the inner surface of a revolving metallic or other containing vessel,) overlapping each other, thus permitting the particles to be subjected to the action of the water, in their passage from one conductor to another.

LEMUEL P. JENKS.

No. 6764.—*Improvement in Adjustable Churn Dashers.*

Having thus fully described the nature, construction and operation of our churn, what we claim therein as new and desire to secure by letters patent, is making adjustable to any desired angle the concave beater, rotating vertically in the process of churning, and thus extending the pneumatic action incident to its concavity to any quantity of milk, the surface of which and the face of the beaters can be made to meet in the same plane, as described.

THOMAS G. CLINTON.
GEORGE H. KNIGHT.
EDWARD H. KNIGHT.

No. 6765.—*Improvement in Machines for making Wash Boards.*

Having thus fully described the nature, construction and operation of my invention, what I claim therein as new and desire to secure by letters patent, is driving by pressure and simultaneously the series of nails necessary to attach one part of a wash board, box, or other article, to another part of the same, as the case may be, by means of the combination of machinery, as described, or any equivalent *device, viz:* the blocks (*m*,) with their series of drivers (*z*,)

and the blocks (*l*,) with their series of nail boxes or mortises (*s*,) springs (*s'*,) and cylindrical guide openings (*y*,) the blocks (*l*,) forming to this extent a portion of the apparatus for nailing by pressure.

I claim the combination of the apparatus for driving nails by pressure, as described in the foregoing specification, with the clamp (*d*,) and the blocks (*l*,) acting as clamps on the article to be nailed by the drivers (*z*.)

I claim the combination of machinery as described, viz: the pressure blocks (*l*,) in their distinct and separate capacity as such, the table (*i*,) bed (*k*,) and clamp (*d*,) by which the crimped and edge sharpened sheet metal is made to incise the wood, and by which, in addition thereto, the legs and body board of a wash board are put and held in suitable juxtaposition for the operation of the drivers, whether the combination of machinery, as described, be operated by levers, toggle and treadle, as described, or by any equivalent devices.

And, lastly, I claim the combinations of machinery, viz: blocks (*m*,) drivers (*z*,) blocks (*l*,) mortises (*s*,) springs (*s'*) guide openings (*y*,) ways (*j*,) table (*i*,) bed (*k*,) and clamp (*d*,) by which I clamp, incise and clamp, and nail, in the order described, the several parts of a wash board, as described, or a box, or other similar article, whether operated by levers, toggles, and treadles, as described, or by other equivalent power.

WILLIAM B. STEWART.

No. 6766.—*Improvements in Sewing Machines.*

Having thus described our improved sewing machine, we shall state our claims as follows:

What we claim as our invention and desire to have secured to us by letters patent, in the above described rotary sewing machine, is arranging the shuttle which carries the filling thread, so that it shall revolve horizontally in a circular shuttle race, said shuttle being constructed with a curved front and pointed nose, which shall travel in a circular guiding groove, sunk below the bottom of said race, so that the shuttle shall invariably pass through the loop formed in the needle thread, all as herein above set forth.

We also claim the pad or washer under the spring arms which carry the shuttle for keeping the filling thread straight, as herein before explained. Furthermore, we claim the arrangement of the wide spring *c' c'*, and bent lever spring *f' f''*, operating as herein above described, or any contrivance substantially equivalent thereto, for relaxing the needle thread when the loop is to be formed, and holding it rigidly when each stitch is to be tightened, as herein above set forth.

We also claim the converging nipper springs, through which the needle, &c. passes, to keep the thread up, and prevent the needle from splitting or breaking it, as herein above set forth.

SHERBURNE C. BLODGETT.
JOHN A. LEROW.

No. 6767.—*Improvements in Machinery for Mitre Sawing.*

I claim the arrangement of circular saws or cutters, revolving vertically, secured to a bed or block, having a horizontal circular motion, the saws or cutters being fitted to arbors moving freely backward and forward in the direction of their axes, this motion of the axes being governed by *guide bars, attached to* blocks capable of being shifted to any angle with the line of the

direction of the stuff to be operated on, these blocks being attached to the moving carriage for the said stuff, and these guide bars operating in grooved pulleys on the axes of the said saws or cutters keeping them, the saws and cutters operating in a line parallel with the said bars, the result of which is that as the stuff to be sawed, with the carriage on which it is placed, advances on the machine, the movement of the saw is in the diagonal line indicated by the direction of the *guide bar* and the cutting of the material conformable thereto, so that at whatever angle the *bar* is placed, with the direction of the material operated on, at such angle will the saw cut it.

I claim the combination of mechanical apparatus in the above specification set forth, by which oblique angled joints, tenons, or work of a similar character can be done, operating if desired, upon both the ends of a piece of stuff at once, and making in that case, similar or dissimilar joints or cuts at the two ends at one operation.

DENNIS S. STOW.

No. 6768.—*Removable Water Lining for the Fire Boxes of Steam Boilers.*

What I claim as my invention and desire to secure by letters patent, is a removable sectional or continuous water lining or false fire box, made and arranged substantially in the manner and for the purpose herein set forth.

JOHN J. DE HAVEN.

No. 6769.—*Improved Machine for Filing Circular Saws.*

What I claim as my invention and desire to secure by letters patent, is the combination of the adjustable collars (*k k'* and *l*,) with the adjustable rectangular timbers or blocks D, for regulating the up and down play of the levers F, F', and files 3, 4, and moving them to either side, as occasion may require, as described, thus adapting the machine to various sized saws.

ISRAEL F. BROWN.

No. 6770.—*Improvement in Boot Crimps.*

What we claim as our invention and desire to secure by letters patent, is the combination of the top (*c*,) and toe (*c'*,) blocks and their respective sheaths D D', with the leg (B,) heel (B'',) and foot (B',) clamps, the whole arranged substantially in the manner and for the purpose herein set forth.

ELI R. HORNER.
W. HOLLAND.

No. 6771.—*Improvement in Gold Washers.*

What I claim as my invention and desire to secure by letters patent, is the combination of the perforated screen *a*, with the ore and water leader *l*, and the jet tube *k*, whereby the materials capable of passing through the holes of the screen, are at once separated from the coarse gold and gravel, and the meshes of the screen are kept perfectly clear.

I also claim the agitator *c*, with its fingers *g*, *g*, *g*, so constructed and operating, that they can have only an alternating motion in combination with the cistern *f*, whereby the coarse particles of gold are separated from coarse sand and other materials, while a current of water is flowing over them, in the manner herein set forth.

I also claim the arrangement in a single machine, of the revolving screen *a*, and the amalgamator *h*, the finger *g*, *g*, and the cistern f, whereby the

washing and amalgamating of gold in fine particles is performed simultaneously and at one operation, with the washing and separating of coarse gold from sand and gravel with amalgamation, in the manner and for the purposes substantially as herein set forth.

LOUIS LACHARME.

No. 6772.—*Improvement in Portable Ovens.*

Having thus described my improvements, I shall state my claim as follows: What I claim as my invention and desire to have secured to me by letters patent, is the combination with the back of a common cylindrical air-tight stove, of an oven frame, and a portable trapezoidal oven, susceptible of being hinged to, or unhinged from said frame, as herein above set forth.

CALVIN DOANE.

No. 6773.—*Improvement in Water Wheels.*

Having thus fully described my wheel, what I claim therein as new, and for which I desire to secure letters patent, is forming the water courses of a series of horizontal flanges with inclined openings for communication, as described, and with contractions or buckets placed at intervals in said compartments, substantially in the manner and for the purpose set forth.

W. G. MASTERSON.

No. 6774.—*Improved Jointed Centre Board.*

I therefore claim and desire to secure a jointed centre board, constructed substantially as herein described, having its two ends connected with the false keel, into which it is recessed, and its centre portions jointed and connected with a rod that passes up into the vessel, by which it can be worked up and down, in the manner and for the purposes set forth.

THOS. MASKELL.

No. 6775.—*Improvement in Cooking Stoves.*

Having thus fully described the nature and construction of my invention, what I claim therein as new and desire to secure by letters patent, is extending the front diving flues *(c,)* along under the hearth plate, aside as at *(d,)* and in front, as at *(e,)* of the ash pan, and thence down in front of the oven plate, thus forming there an open flue, when the oven is extended under the hearth plate, in the manner and for the purpose herein described.

JAMES LEFFEL.

No. 6776.—*Improvement in Hydraulic Presses for Cotton, &c.*

What I claim as my invention, and desire to secure by letters patent in the double hydrostatic press, is connecting the two rams substantially in the manner set forth, so that they shall operate together, and with equal effect, upon the platen of the press, all as set forth.

CHARLES WILSON.

No. 6777.—*Improvement in Churns.*

What I claim as my invention and desire to secure by letters patent, is the combination of a reciprocating dasher *(h,)* with a revolving dasher *(b,)* the two being arranged and operated substantially as herein set forth.

ALEX. HALL.

No. 6778.—*Improvement in Burring Cylinders.*

Having thus described my improvements, I shall state my claim as follows:—

What I claim as my invention and desire to have secured to me by letters patent, is a cylinder for burring, opening, picking, carding, &c., cotton and wool, in which the burring or working surface is formed by alternate rows of sharp pointed teeth, and thin metallic edges either set spirally or straight across the cylinder, whether said teeth and edges are constructed and shaped as above set forth, or in any other way substantially similar thereto; it being distinctly understood that my claim is to the burring or working "*surface*," produced as above suggested.

CHAS. G. SARGENT.

No. 6779.—*Improvement in Supporters for Telegraph Wires.*

What we claim as our invention and desire to secure by letters patent, is the uniting and confining the shank of a pendent wire holder, or the upright portion of a supporter within a protecting socket or cavity by means of some suitable insulating substance placed while in a fused or softened state within the socket or cavity, and occupying the space between its interior surface and the shank of the holder or supporter, substantially in the manner herein set forth; not intending, however, to limit ourselves to the particular forms or positions of the insulated wire holders and supporters referred to above, the essence of our invention as therein claimed, being the production of an insulated connection between the wire supporters and the holders, by placing the insulating material, while in a fused or softened state, within a socket or cavity in the one and around the shank of the other.

We also claim the manner of confining the telegraph wire to the holder G, by means of a notch or hook thereon and a loop or link *s*, combined therewith, substantially as represented in fig. 3.

L. R. LIVINGSTON.
AMOS KENDALL.
ALFRED VAIL.
J. J. ROGGEN.
CALVIN ADAMS.

No. 6780.—*Improvement in Hanging Shafts in Mills.*

I do not claim the suspending a box or bearing for a shaft by means of the ball and socket joint, nor the making the same in several parts; but what I do claim as my invention and desire to secure by letters patent, is the general arrangement and construction of the complete hanger or pillow-block, with or without the oil-catcher forming a part thereof, made substantially in the manner and for the purposes herein above described.

EDWARD BANCROFT.

No. 6781.—*Improvements in Ore-Washers.*

Having thus fully shown the construction and operation of my gold-washer, what I claim as new and my invention and desire to secure by letters patent, is—

First. The arrangement of the bevel wheel with a rib on the back, in com-

bination with the pin O, set screws N, and pinions L and M, which are for the purpose of giving a reciprocating rotary motion to the pan.

Second. The vibrating pump in combination with the pan.

Third. The reciprocating rocker with curved ribs, in combination with the shaft F, and its fingers, substantially in the manner and for the purpose set forth.

JACOB PRITCHETT.

No. 6782.—*Improvements in Reciprocating Propellers.*

What I claim as of my own invention and desire to secure by letters patent, is the combination of the sliding frames (b, b',) to which the paddles are attached with the horizontal guides (c, c',) and vertical guides (d, d,) said paddles being actuated by motion derived from, and mechanism connected with, the engine shaft, and the whole being constructed, arranged and operating substantially as herein described, whereby a more extended horizontal motion of the floats, in comparison with the length of their vertical motion, is obtained.

H. W. HEWET.

No. 6783.—*Improvement in the manufacture of Band Boxes.*

What I claim as my invention and desire to secure by letters patent, is the construction of the concavo-convex heads or top and bottom boards C D, inserted into grooves formed in the bodies of the box and lid and secured by glueing, with the additional concavo-top board E, susceptible of being replaced at pleasure, as herein set forth.

WILLIAM TABELE.

No. 6784.—*Improvement in Bed-plates for Paper Engines.*

What I claim as my invention and desire to secure by letters patent, is not the construction or use of a rag engine bed-plate, with upright edges or knives, made of steel plates, and doubled together, and which has been heretofore in use for grinding rags; but what I do claim, is casting the bed-plate of the paper engine in one piece, having the cutting or grinding edges arranged over the surface of the plate in diamond or lozenge shaped figures, or in curves, so as to present a number of angles or shearing edges for the rags to pass over between that surface and the roller above, in the manner and for the purpose set forth.

WILLIAM CLARKE.

No. 6785.—*Improvement in Lapping Machines.*

What I claim as my invention and desire to secure by letters patent, is the manner in which the heads are constructed and arranged so as to revolve in removing or changing the laps; also the introduction of the doubling roller as part of the same machine, and the manner in which the adjusting guides are constructed, so that one or more can be displaced and the remainder uniformly divided into the same space occupied by the whole, whether the arrangements are precisely the same as herein represented, or in any other manner which is substantially the same, and producing a like result upon the same principle.

SAMUEL CAMPBELL.

No. 6786.—*Improvement in Elastic Cords for Suspenders.*

I do not claim simply covering threads of metallic or vulcanized rubber with braid, as this has long since been done, but not whilst the India rubber is in a state of tension; nor do I claim simply combining non-elastic cords with the button hole pieces, and with the shoulder straps of suspenders, by passing such cords through loops or around rollers attached to the shoulder straps, as this has also been long known; but—

What I claim as my invention and desire to secure by letters patent, is the making of elastic cords for suspenders, by braiding or winding silk, cotton, or other threads around cords of metallic or vulcanized India rubber, whilst in a partially distended state, substantially as described, whereby springs of greater resisting force are produced than by any other known plan.

NELSON GOODYEAR.

No. 6787.—*Improvement in Cooking Stoves.*

Having thus fully, clearly, and exactly described my improvements in stoves, what I claim therein as new and desire to secure by letters patent, is constructing and arranging the top or boiler flue *(a,)* the middle flue *(f,)* and the side flues *(l,)* of the flues between the ovens and the corner flues *(l',)* at the back of the lower oven, so that by opening the dampers *(t,)* and *(s,)* the upper oven *(d,)* can be rendered operative alone, or by closing the same dampers *(t,)* and *(s,)* be operated in connection with the lower oven *(e,)* the flues *(j,) (k,) (l,) (l',)* and *(q,)* and guide plate *(r,)* being so constructed and arranged that the heat and draught will be compelled to pass along the sides and corners of the stove, when these flues are thus or in an equivalent manner called into action, the heat being thereby most equably distributed, as the hot draught is thus made to traverse an equal distance both above and below the lower oven, and also surround the centre of the stove, and of course keep the said centre at the same temperature as the sides and corners, the whole being arranged, constructed and combined in the manner and for the purpose described.

HANNIBAL MATHEWS.

No. 6788.—*Improvement in Ploughs.*

What I claim as my invention and desire to secure by letters patent, is joining the lower edges of the mould board, and fixed land side *d*, by means of a sole *e*, cast in one piece with them, whereby the plough is greatly strengthened, and the fastening of the share rendered more secure.

Second. I claim making an aperture *h*, through the side of the fixed land-side, for the purpose of introducing a wrench to turn the nut on the bolt which holds the share to the sole, the aperture being combined with the manner herein described of fastening on the point.

BENJAMIN SEYLER.

No. 6789.—*Improvement in Apple Parers.*

I lay no claim to the invention of the combination of a rotating apple holder or shaft, and a knife fixed to a bar, whose movements, in order to keep the knife against the surface of the apple during the operation of removing the peel, are directed by the hand of a person applied to it; but what I claim as my invention, is the use of the upright lever arm Q, in combination with the *rack bar P, for working* the knife in the manner and for the purpose set forth.

I also claim the upright lever Q, in combination with the inclined lever bar R, and discharging bar W, in the manner and for the purposes described.

CHARLES P. CARTER.

No. 6790.—*Improvement in Tanning Leather by Tannin and Acids.*

What I claim and desire to secure by letters patent, is—

First. The process of removing hair and wool from skins, and of liming them preparatory to tanning, by the use of the composition of lime, wood ashes and salt, called composition No. 1, in the manner above described; but I do not claim either of these materials separately by itself.

Second. I claim the process of tanning skins by the use of tannin, in combination with muriatic acid, generated by a mixture of sulphuric acid and cloride of sodium in water with the tannin, in the manner substantially as above described.

Third. I claim also the use of the acetate of lead, in the above process of tanning, as described.

HARMON HIBBARD.

No. 6791.—*Improvements in Ore Washers.*

What I claim as my invention and desire to secure by letters patent, is the rotating screen, substantially as described, in combination with the rockers and drag chains within it, substantially as described.

I also claim the rotating screen, with the spiral blades on its outer periphery, in combination with the trough in which it works, and through which the substances delivered by the meshes of the screen are made to pass, substantially as described.

I also claim the washing trough, with its compartments, in combination with the rockers and drag chains, substantially as described.

And, finally, I claim the longitudinal grooves or chambers in the bottom of the trough, and at right angles to the motion of the rockers, and in combination with such rockers, substantially as described.

PETER VON SCHMIDT.

No. 6792.—*Improved Machinery for drawing out and compressing Heated Iron.*

What I claim as my invention and desire to secure by letters patent, is the method of working puddlers' balls, or other highly heated masses of iron, and reducing them into bars, by rolling and squeezing them gradually from one end, and by surfaces whose motion or motions is at right angles, or nearly so, to the axis of the bar to be produced, substantially as herein specified.

And I also claim as my invention in the machinery for the application of my improved method of working iron, the rolling and squeezing of balls or other highly heated masses of iron, between surfaces inclined to the axes of the bar to be produced, substantially as described, so that by the motion of one or more of the said surfaces at right angles, or nearly so, to the axis of the bar to be produced, the mass of iron shall be gradually squeezed and reduced and carried towards and out of the space between the said inclined surfaces where they are nearest together, the iron bar being thus delivered in the required form, substantially as described.

H. BURDEN.

No. 6793.—*Improved Journals for Oscillating Propellers.*

Having thus described my improvement, what I claim and desire to secure by letters patent, is the application of springs to the journal boxes in such a manner as to ease the strain upon the cranks and paddles when the paddles meet with an extra weight or resistance suddenly, thereby lessening very materially the danger of breaking the cranks and other parts of the machinery which are combined and operated substantially as herein set forth.

MATTHEW A. CROOKER.

No. 6794.—*Improvement in Boot Crimps.*

Having described my improvement, and the manner in which I construct my instrument, what I claim as my invention is the method of securing and holding on to the leather by means of the wedge operating in the mouths or openings in the ends of the prongs of the instrument, as herein described and set forth.

BENJAMIN LIVERMORE.

No. 6795.—*Improvement in Accoucheurs' Chairs.*

What I claim as my invention, and desire to secure by letters patent, is the seat, which from its peculiar form and structure, closely resembles that part of the human frame between the knees and the breech.

And I further claim varying the angle which the seat makes with the back, by moving the middle posts forward or backward, by means of the tightening screws 21, and the grooves on the front end of the braces 4, through which groove the said tightening screws pass into said middle posts 2, the object of all which is to afford relief to a patient in travail by means of changing her position and furnishing supports for her feet and limbs, and objects for her hands to grasp.

NEWMAN W. SMITH.

No. 6796.—*Improvement in Instruments for arresting Hemorrhage from Internal Organs or Cavities.*

What I claim as my invention in the foregoing described instrument, is the application of an elastic and detensible bag, sack or bottle to various of the canals or cavities of the human body opening externally, and the subsequent distension of the same by forcing into it air or other available fluids for the purpose of arresting hemorrhage, and this do I desire to secure by letters patent.

ASHBEL BRADFORD HAILE.

No. 6797.—*Improvements in Looms for Figured Fabrics.*

What I claim therefore as my invention, is a combination of machinery, composed of the following elements, and applied to a series of shuttle boxes for moving and operating them as specified:—

The first element of combination is the series or two packs of pattern plates.

The second element is the two slide or moving frames by which the plates are moved horizontally, as above described.

The third element is the machinery for moving the pattern plates in vertical directions, one set being moved upwards and the other set downwards, substantially as specified.

The fourth element is the system of hooks $e' e'$, &c., their lever plates $h' h'$, &c., bell crank levers and connections.

The fifth element is the slide board R, and its series of slides $h i k l$, &c., and their projecting pins and appliances, as above described.

The sixth element is the system of bent levers V W, pawls T U, and mechanism for moving the same, as described.

The seventh element is the toothed sector and rack, which connects the long arm of the series of shuttle boxes with the slide board R.

I also claim the combination of machinery applied to shuttle boxes, and for the purpose of preserving the position of the series while any shuttle thereof is in operation, the said combination consisting of the series of pins $r^3 r^3$, &c., the fork lever k^3, the lever n^3, and its hinged spring plate s^3, the slide y^3, and its pins or studs, the spring pawl u^3, and their appurtenances, the whole being made to operate together substantially as above specified. I wish it distinctly understood that I do not intend to confine my claims to the construction or form given to each element of combination, as above described, but intend to vary the same as circumstances or necessity may require, while I do not change its character or principle of operation.

JOSEPH REYNOLDS.

No. 6798.—*Improvement in Cooking Stoves.*

Having thus fully described the nature and operation of our invention, what we claim therein as new and desire to secure by letters patent, is—

First. Providing for the escape of the steam and effluvia from the cooking victuals in a reverberating boiling chamber, a channel arranged so as at the same time to isolate the upper oven from the top flue, and by means of the currents keep it cool as well there, as where bounded by the fire plate.

Second. So forming and arranging the plates dividing the lower from the upper oven and ash pit, with a descending flange to the upper plate, and an ascending flange to the lower plate, that a passage to the flues for the fumes of the lower oven is provided, without weakening the plates, or permitting the ashes to fall through.

Third. So arranging a vertical dividing plate in the front flue, in connection with the damper, that a part of the heat of the fire can be applied more directly to the front plate of the lower oven.

Fourth. So constructing and arranging a damper in connection with the flues, division plate and stack, with or without the recess in the front plate, as described, that the draught can be thrown either entirely around the stove, or in part down the front of the same, or be entirely shut off, or have direct entry to the stack.

THOMAS G. CLINTON.
GEORGE H. KNIGHT.
EDWARD H. KNIGHT.

No. 6799.—*Improvement in Grate Bars.*

What I claim as new and my invention and desire to secure by letters patent, is making the centre of the lower face or under side of the bar with the same swell or elevation as the upper or top face, as shown at *a*, *a*, in the accompanying drawing; *b*, *b*, *b*, *b*, being the bars, *c*, *c*, *c*, *c*, *c*, *c*, the spaces; the bars connected at *d*, *d*, *d*, *d*; *e*, *e*, *e*, *e*, being the shoulder or rabbit to support the bar when in its place in the furnace, and *f*, *f*, *f*, *f*, being projections to meet similar projections on the adjoining bars, to keep them at the proper distance apart.

I do not claim as my invention, making the upper side of the bar with the swell or elevation in the middle of its length; but I do claim as my invention, making the upper and lower faces of the bar with the same rise or elevation, so that when the upper or top face of the bar is destroyed by the action of the fire, the bar can be turned or inverted, making the lower side to become the upper surface, and by that means present a new surface to the fire, causing thereby a considerable saving in the expense of furnace bars.

I do not mean to be understood as limiting myself to any particular number of bars in each series, but to make one, two, three, or any other number of bars in each series as may be required, substantially as above described, for the purposes therein set forth.

C. KINGSLAND.

No. 6800.—*Improved method of attaching Knobs to Doors.*

I do not claim the mode of fastening the one knob on to the door, by means of screwing the circle plate thereto, nor do I claim the mode of inserting the one shank into the other, for the purpose of accommodating the thickness of the door; but what I do claim as my invention and improvement and desire to secure by letters patent, is the mode of holding in position the knob figure 4, by means of the end of the latch, figure 3, being pressed through the opening *m*, into the stirrup at *h*.

J. A. CREVER.

No. 6801.—*Improvement in the Rockers of Gold Washers.*

Having thus fully described my improvement, what I claim therein as new and for which I desire to secure letters patent, is the compound action rocker, constructed and arranged substantially in the manner and for the purpose set forth, consisting of rockers with ribs or projections thereon, and springs to arrest them.

I also claim the sliding plate, in combination with said ribbed rocker, as above described.

THOMAS J. GREEN.

No. 6802.—*Improvement in Bog Cutting Machines.*

What I claim as my invention and desire to secure by letters patent, is the box or sledge provided with horizontal and vertical knives, which project from its side, cutting off the hummocks or tufts, the whole being made and arranged as herein set forth.

ABNER FOLLET.

No. 6803.—*Improved Double Cylinder Spike Machine.*

What I claim as my invention and desire to secure by letters patent, is the method of forming or compressing a spike between half dies on the periphery of two cylinders revolving in opposite directions, the axis of the spike being parallel with the axis of the cylinders, substantially as herein described, said cylinders being provided with appropriate devices for cutting off, feeding in, and heading the spikes.

EDWIN B. WHITE.

No. 6804.—*Improvement in Machines to Manufacture Horse Collars.*

What I claim as my invention and desire to secure by letters patent, is the combination of the T shaped segmental sliding forming blocks F, with the central oval shaped forming block C, and mortised bench A, into which they are secured, said sliding segmental forming blocks being pressed against the rim of the collar, by means of keys, in the manner herein fully set forth. The oval shaped former and bench are not claimed individually or in connection, as they have been heretofore used for making horse collars, in combination with a rope and windlass for drawing the collar around the block, the before described machine being principally designed for bending and holding the rim of the collar to its required form, the shaping of the rest of the collar being done in the usual manner.

WILLIAM CRISWELL.

No. 6805.—*Improved Method of giving a rotary motion to the melted Iron in Casting Chilled Rolls.*

What I claim as my invention, and desire to secure by letters patent, is the application of a guide to the mouth of a gate entering the mould horizontally in direction at right angles to the axis of the cylinder, for the purpose of producing the swirling motion of the iron. I also claim, in connection with the guide, the use of the collar connecting at all parts of the circumference with the mould, so as to admit the iron in a steady stream at all parts at the same time.

JOHN C. PARRY.

No. 6806.—*Improvements in Jacquard Looms.*

What I claim as my invention therefore, and desire to secure by letters patent, is—

First. Giving to the jacquard frame of jacquard looms working by power, a separate organization, that is, giving the various motions of the jacquard by a shaft or shafts within, or making part of the jacquard in contradistinction to the weaving loom, but receiving motion from the loom or from some first mover governed by or working in unison with the loom, substantially as described and for the purpose specified.

Second. I claim the method of adjusting the jacquard frame relatively to the weaving loom, substantially as described, so that the attendant can from a given point make the adjustment to suit the condition of the harness, as described.

Third. I claim taking the motions for operating the picker-staffs, and the apparatus for shifting the shuttle boxes, from a shaft or shafts placed above and in combination with the pendulous frames which carry the shuttle boxes, substantially in the manner and for the purpose specified.

And lastly, I claim in combination with the power loom a reversing motion, substantially as described, so that after the driving power has been removed, and the momentum of the moving parts arrested, the attendant may set in motion the reversing motion, and drive the loom in the reverse direction to bring the parts to the position required for re-starting, substantially as described.

E. B. BIGELOW.

No. 6807.—*Improvement in Cooking Stoves.*

What I claim as my invention and desire to secure by letters patent, is the manner herein described of causing the air contained within the oven and spaces to circulate within and under the oven, without allowing the heated air to pass from the oven or spaces into the fire chamber or smoke pipe; which effect is produced by locating the plate *e*, within the oven and near the fire back *d*, and connecting the space between *e* and *d*, with the body of the oven and with the space between the bottom plate of the oven and the plate *b*, and also connecting the space below the bottom plate of the oven with the rear end of the body thereof, substantially as herein set forth.

Not intending by this claim to restrict myself to the mode of construction herein described, but to vary the same as I may deem expedient, while I attain the same ends by means substantially the same.

JAMES R. STAFFORD.

No. 6808.—*Improved Spring Latch Bolt.*

I wish it to be understood that I do not claim the making of the latch bolt in two parts, and in other respects as I claimed in the specification of the application for a patent, to which I have herein before alluded, and which is now lodged in the patent office of the United States; but that which I do claim as my invention and desire to secure by letters patent, is arranging the spring in the cavity of the bolt, with one end of said spring bearing upon the end of the cavity in the bolt, and the other end of it, or its equivalent, upon the tumbler, as herein described, whereby I am enabled to dispense with the usual bearings for the spring external to the bolt.

ELIAS M. RAY.

No. 6809.—*Improvement in Planing Machines.*

What I claim as my invention and desire to secure by letters patent, is the combination of adjustable stationary planes, with an endless band supported transversely by friction rollers (*h*, *h*,) whose axes are immediately below the cutting edges of the plane irons, and longitudinally by strips (*f*, *f*,) substantially in the manner and for the purpose herein set forth.

ENOS G. ALLEN.

No. 6810.—*Improvement in the Construction of Iron Stairs.*

Having thus described my improvement in the construction of metallic stairs and the advantages arising therefrom, I claim as my invention and de-

sire to secure by letters patent, constructing stairs in sections composed of the bent lever and under brace connected together, as shown in fig. IV, the tread and brace being part and parcel or continuous with the balusters, the one bent at right angles, the other at the requisite angle for the brace.

I also claim the bent levers, as herein before described, in combination with the rail, either continuous or in sections, attached to the end of the long arm of said lever, together with the under brace attached to the angle or bend of the short arm of said lever.

BENJAMIN F. MILLER.

No. 6811.—*Improved arrangement of the Lever half beam of Steam Engines.*

What I claim as my invention and desire to secure by letters patent, is the arrangement of a horizontal cylinder, with a lever half beam, having its fulcrum at its lower end, and connecting rod attachment at its upper end, with crank and shaft above the cylinder, substantially in the manner and for the purposes herein before described.

WM. A. LIGHTHALL.

No. 6812.—*Improvement in Blocks for holding Daguerreotype Plates.*

What I claim as new and of my own invention and desire to secure by letters patent, is the application of the cross piece *b*, and lip clips 5, 5, with the thumb screw *c*, to hold the plate to be polished on the face of the plate *a*, the plate below the centre 4, of the thumb screw *c*, being fitted to receive through an aperture in the centre of the screw, a point, or stud, on a lever by which the plate *a*, can be moved in alternate and opposite directions across the face of a rotary chuck for the purpose of polishing or cleaning daguerreotype plates, substantially as described and shown.

ALEXANDER BECKERS.

No. 6813.—*Improvements in Looms.*

Having thus described the construction and operation of my loom for weaving tubular webs, what I claim therein as new and desire to secure by letters patent, is straining the several divisions of the warp from the same yarn beam equally, by passing the adjacent yarns of the respective sheds over the same whip roll, the extreme yarns being passed over a second whip roll, substantially as herein described.

I likewise claim varying the closeness of the texture of the web, by varying the speed of the rolls (H, H′,) by which it is drawn through the loom, by devices substantially such as herein set forth.

AUGUSTUS FAULKNER.

No. 6814.—*Improvement in Invalid Bedsteads.*

What I claim as my invention and desire to secure by letters patent, is the use of the lever to alternately raise and depress the sliding boxes, when these boxes are combined with the horizontal drawer, for alternating, placing the chamber and cushion under the permanent opening in the mattress, as described and represented.

JOHN KARNEY.

No. 6815.—*Improvement in Apparatus for Distilling Sea Water.*

What we claim as our invention and desire to secure by letters patent, in the before described apparatus for the distillation or production of fresh water on board of ships or other vessels, is connecting the steam boiler with the condenser, by means of a flexible pipe, substantially as described, in combination with the valve joint connection of the bonnet or steam dome covering the hand hole in the top of the boiler, substantially as described, whereby this connection is rendered of manifold uses, as described.

We also claim condensing the steam, by passing it in a space between two vessels, the inner one kept cool by a current of water, and the external one surrounded by woollen or other porous substance, to be kept in a moist state, to condense the steam by the evaporating effect of the atmosphere on the moistened surface surrounding the outer case, substantially as described, whereby the apparatus is especially adapted to very low latitudes, as described.

And, finally, we claim the feed pipe for supplying water to the condenser, and for feeding the boiler, substantially as described, in combination with the cistern that conducts the feed water to the boiler, and provided with a float for regulating the flow of water from the feed pipe, substantially as described, whereby the apparatus is rendered self-feeding without liability of derangement, as described.

R. B. FORBES.
J. ERICSSON.

No. 6816.—*Improvement in Surfacing Floor Oil Cloth.*

Most of the parts employed by me in these arrangements and operations are not new in themselves, having been before employed separately for many purposes; therefore, I do not claim any of such parts herein so employed by me, irrespective of the manner in which I use them; but I do claim as new and of my own invention and desire to secure by letters patent of the United States, to be issued to James D. Sparkman and Melville Kelsey, as my assignees, as follows:

The application of the fixed suspending timbers, or slotted railways *d*, and carriage *g*, with the changeable slotted timber or railway *e*, to carry and adjust the working parts at different heights and positions on the grounding frames, conjointly with the arrangements described and shown, by which the arms *m*, *m*, and a plurality of surfacing blocks *p*, *p*, are applied to smooth the face of the canvas A, A, by the power of a man or men, operating through the crank *z*, and cylinder *s*, and pinion *t*, in alternating right lines on the rack *v*, and kept in place by the collar *u*, carriage *x*, and rollers *y*, *y*, and the employment, conjointly with the foregoing parts, of the blocks *q*, and *r*, and screws 4, 4, to adjust the pressure of the blocks *p*, *p*, on the face of the canvas operated on; the whole constructed, arranged and operating substantially in the manner and for the purposes herein described and shown.

WILLIAM BERRY.

No. 6817.—*Improved Circular Saw-Set.*

What I claim as my improvements and desire to secure by letters patent, are the diagonal and angular adjustable slotted gauges attached to the set, in the manner and for the purposes herein described.

ELHANAN WINCHESTER SCOTT.

No. 6818.—*Improvement in Locomotives for ascending Inclined Planes.*

Having thus described the construction and operation of my improved locomotive, what I claim therein as new and desire to secure by letters patent, is a spring or other equivalent device for holding a self-adjusting toothed driving wheel in gear with a toothed rack, substantially as herein set forth.

I likewise claim the employment of steam acting on the piston of a supplementary cylinder, to throw an adjustable toothed driving wheel in or out of gear, with a stationary rack, and at the same time to operate as a spring to hold it in either position, substantially as herein set forth.

ANDREW CATHCART.

No. 6819.—*Improvement in Apparatus for holding Daguerreotype Plates.*

We do not claim to have invented a vice for this or any similar purpose; nor do we claim to have invented any of the parts herein described, as all are well known,—

But we do claim as new and of our own invention, and desire to secure by letters patent of the United States, the application of the cam 8, acting to depress the rebated chop 6, on the plate 9, beneath, conjointly with the screw 7, to adjust the parts for the purpose of holding the plates while polishing the same, substantially as described and shown.

WILLIAM LEWIS.
W. H. LEWIS.

No. 6820.—*Self-adjusting Valve for Regulating the admission of Air to Fan Blowers.*

What I claim as my invention and desire to secure by letters patent, is the combination of the case of resisting plates D, and mortised end plate B, with the turning valve E, F, when made with radial wings E, and segmental cut off plates F, retained in its required position by a spring, or by a weight, cord and pulley, or other mechanical equivalent; said valve operating substantially in the manner and for the purposes herein set forth.

FRED'K S. BARNARD.

No. 6822.—*Improvement in Gearing.*

What I claim as my invention and desire to secure by letters patent, is the mode of transmitting motion from the pulleys of a double geared lathe, or turning engine, to the main shaft or arbor A, of the same, with a decreased speed and a corresponding increase of power by means of the eccentric *c*, secured on the inside of the large hollow pulley B, and turning within the large wheel C, arranged eccentric with the shaft and having cogs *e*, on the inner periphery of the projection *d*, at its outer edge, meshing in gear with a circular cogged ring F, secured to the inner surface of the detached face plate *i*, and held stationary by the connecting rod or plate G, and also the hub D, keyed to the shaft or arbor A, having arms *f*, made convex on their extremities and concave on their sides, so as to form circular openings *g*, or spaces, when inserted in their places, in which the bolts or pins E, revolve in their passage around the axle or arbor, alternately striking the concave sides of the arms, and causing them to revolve slowly, in such a manner as to cause the large cog wheel C, to revolve around the cogged ring F, just so many

cogs as it possesses more than said ring, at every revolution of the eccentric *c*, and a proportionate slow speed to be given to the shaft or arbor A, as herein set forth, or in any other mode substantially the same.

BENJAMIN ARNOLD.

No. 6822.—*Improvement in Feed Apparatus for Shingle Machines.*

I claim a *self-adjusting feed motion* produced by the interposition of friction between metallic surfaces in the connections of the parts of the driving gear, or any two of those parts, by means of a *friction strap*, as described, or any analogous mode, which shall allow the adaptation of the speed of the carriage holding the material to be cut, to the resistance the material affords to the saw, especially in cases where unusual and temporary obstacles, such as knots, &c., interpose, which might otherwise cause the destruction of the teeth of the saw and other parts of the machine—a very important practical result of the adjustment being that it produces smoother sawing in stuff of irregular texture than machines now do.

HENRY BURT.

No. 6823.—*Improvement in Looms.*

Having thus fully described my improved loom, what I claim therein as new and for which I desire to secure letters patent, is—

First. The combination of the jacquard cylinder with the depressing frame, and fingers for the purpose of working the uprights (*f*,) thereby through the medium of the fingers, as herein set forth.

Second. I claim the combination of the lifting and depressing frames with the crank shaft, by means of a rock shaft connected with said frames by connecting rods, and worked by the crank shaft with which it is connected by a rod for that purpose.

Third. I claim the frames for suspending and carrying the harness in combination with the marches *e*, and the apparatus for working the same, as above specified.

Fourth. I claim the combination of the hooks for lifting and depressing with the marches and harness frames, without the aid of cords, as herein set forth.

Fifth. I claim the construction and application of the adjustable crank by which I effect an adjustment in all directions in a simple and convenient manner.

HENRY BACHOFNER.

No. 6824.—*Improvement in Stoves.*

Having thus fully, clearly and exactly described the nature, construction and operation of my invention and improvements in stoves or furnaces for heating, cooking or other purposes, for which equivalent combinations are suitable; what I claim therein as new and desire to secure by letters patent, is concentrating the issue of the gases, evolved during combustion, as they pass from the fire chamber into a reverberating chamber, and are at that point commingled with jets of air, the said issue or orifice being in the proportion of a circle of one third (or less) the diameter of the reverberating chamber into which it opens, and combined with an opening for the discharge of the reverberated current, as illustrated in fig. 1, by the fire bowl (*d*,) orifice (*h*,) drum (*k*,) and opening (*q*,) and for the purposes set forth.

I also claim the disc *(o,)* inserted immediately above or on a level with the top of the opening *(q,)* for the exit pipe, and having a central orifice *(m,)* of suitable diameter, and perforations *(n,)* arranged as described and for the purposes set forth.

I also claim the disc *(o,)* constructed and described, in combination with the orifice *(h,)* as described and for the purposes set forth.

I also claim locating the opening *(q,)* for the exit pipe, as described, in combination with the disc *(o,)* and the orifice *(h,)* in the manner and for the purpose set forth.

JAMES COLE.

No. 6825.—*Improvement in keeping Ledger Accounts.*

Having thus described my invention, I claim the box, with the plate or false bottom *a*, constructed with the slits for the reception of the cards, as represented in figure 1, the said cards being arranged in the manner represented in figure 1, with two alphabetical indexes arranged at right angles to one another, as a direct index reference to the name and surname of individuals with whom accounts are kept.

I also claim the card index formed with the shoulder *b*, to suspend the card in the slit of the plate or false bottom *a*, and to form a part of said card to pull it out and insert it in the slit, as herein represented and described.

ANDREW J. FOLGER.

No. 6826.—*Improvement in Barrel Carriages.*

What I claim as my invention and desire to secure by letters patent, is the combination of the arcs D, and hinged legs F, F′, with a barrel carriage, substantially in the manner and for the purpose herein set forth.

WILLIAM FURLEY.

No. 6827.—*Improvement in Mills for Grinding.*

Having thus fully described and represented the nature and operation of my improvements in flouring mills, what I claim therein as new and desire to secure by letters patent, is—

First, Surrounding the feeding tube and cup with a shield, constructed and attached as described, or in any analogous manner, and for the purpose described, viz: preventing the blast of air from distributing the regularity of the feed, and deflecting and directing the same vertically downwards, so as to cause it to force the grain between the grinding surfaces of the stones.

Secondly. Inserting and extending down into the eye of the runner a cylinder to which the balance rive is permanently attached or cast, (whether made with or without a metallic back and hoop for the stone,) attached at its upper portion to the stone, forming with the eye of the runner stone, at its lower portion, a recess into which the stationary cylinder of the bed stone projects, and furnishing an attachment for the balance rive elevated above the centre or face of the runner, the whole being arranged as described, or in any analogous manner, and for the purpose described, viz: preventing any grain jumping over the top of the stationary cylinder that stands on the bed stone, and hanging against or choking the eye of the runner stone, directing the air blast vertically downwards, in connection with the cylindrical projection of the shield; and, most importance of all, affording an attachment for the balance rive above the level of the grinding surface of the

runner, thus leaving the same undiminished and unbroken, and avoiding the usual interference of the balance rive and driver with the feed, or its tendency to hanging in the eye of the runner stone if the stationary cylinder on the bed stone is not used.

Thirdly. Attaching to the bed stone a cylinder resting on suitable feet, and within the sweep of the eye of the runner, the cylinder or circular partition being of such diameter and elevation as fit it to project up into the recess formed by the eye of the runner stone and the cylinder which is inserted and attached therein, and to allow the same to revolve around and within it, the whole being arranged as described, or in any analogous way, and for the purpose described, viz: preventing the grain coming into contact with or being carried around by the revolving runner, and thereby hanging in and choking the eye of the same, the grain not having the same tendency to hang on the vertical wall of a stationary cylinder, and also continuing the vertical and downward direction given to the blast until it escapes between the stones.

Fourthly. In combination with the closed air chamber for passing the blast between the stones, dressing the inner and leaving without dress the outer portion of the area or face of the stones, say from the circle described by the eye of the runner, dressing one half the radial distance, more or less, thence out and leaving the balance all land.

Fifthly. The combination of the shield (*i* and *j*,) the cylinder (*n*,) and the cylinder (E,) arranged and constructed as described, or in any analogous way, and for the purpose described.

LEWIS FAGIN.

No. 6828.—*Improved Weather Strip.*

I claim the hinge, constructed as set forth in the above specification, in combination with the mode of stopping the same from shifting its position horizontally to the right or left hand when in ordinary use.

I also claim the method of detaching the lower strip, whenever desired, by the method in this specification described, in combination with the mode of keeping the lower strip suspended above the sill, as herein above set forth.

EBENEZER GARNSEY.

No. 6829.—*Improvement in Planing Machines.*

Having thus described my invention and the means of operating it, what I claim therein as new and desire to secure by letters patent, is graduating the pressure applied to the lumber on the rest, in proportion to its thickness, substantially as herein set forth.

HUGH JETER.

No. 6830.—*Improvement in Flour Packers.*

Having thus fully described my improved apparatus and its mode of operation, what I claim therein as new and for which I desire to secure letters patent, is—

First. The packing apparatus, consisting of a combination of the tube *b*, and inclined blades for condensing the flour, and retaining it while moving the barrel, substantially in the manner and for the purposes set forth.

Secondly. I claim the hollow shaft for expelling the air from the barrel in packing, as above described. I also claim the self-acting clutch, in combination with the packing apparatus, in the manner above made known.

NATHAN KINMAN.

No. 6831.—*Improvement in Fences.*

Having thus fully described my invention, what I claim and desire to secure by letters patent, is the mode of fastening pickets or paling fences by means of a series of links *a*, formed on the wire for receiving and retaining the pickets, the ring *d*, for securing the wire to posts, and the hooks *b* and *c*, for connecting the pieces of wire together in a line of fence, in the manner substantially as herein set forth.

LUCIUS LEAVENWORTH.

No. 6832.—*Improvement in Power Looms.*

Having fully described the construction and operation of my improvements in power looms, what I claim and desire to secure by letters patent, is—

First. The cam *r'*, on the fast pulley E, in combination with the lever or click *q'*, the crooked rod *q*, the coil spring *t*, the catch *s'*, and the lever *d*, constructed and arranged in the manner substantially as described, for the purpose of arresting the motion of the loom at pleasure, as herein set forth.

Second. I claim the mode of stopping the action of the loom instantaneously by a self-acting operation, when the shuttle gets caught in the race way of the lathe, by means of the chisel *o'*, on the rod *e*, catching against the head S, on the crooked rod *q*, and projecting the click or break *q'*, against the cam *r'*, on the fast pulley E, in the manner substantially as herein described.

Third. I claim the combination of the vibrating lever or treadle *g'*, and the connected spring *g*, with the cord or rod *f*, the vibrating fingers *o*, *o*, on the rod *e*, and the fenders *p*, *p*, for the purpose of arresting the momentum of the shuttle as it enters the boxes, the cam *h*, on the shaft L, operating and giving motion to the fingers, in the manner substantially as described.

ROGER LIGHTBOWN.

No. 6833.—*Improvement in Stoves.*

Having thus fully, clearly and exactly described the nature, construction and operation of my invention, what I claim herein as new and desire to secure by letters patent, is attaching the exit pipe (*u*,) to the funnel shaped tube or shute (*j*,) so as to collect and transmit down into the fire the soot precipitated during the passage of the results of combustion to the exit pipe, substantially after the manner and for the purpose herein fully described and represented.

ADOLPHUS LOTZE.

No. 6834.—*Improvement in Mills for Grinding.*

We do not claim to have invented a cup to intervene between the bail spindle and fixed centering cup; but what we do claim as new and of our own invention, and desire to secure by letters patent of the United States, is—

First. The construction and application of the cup *b*, with edges 4, 4, to receive the bail and spindle, preventing the ends of the spindle from separating, thereby forming a more permanent attachment to the bail.

Second. The construction and application of the cylinder *e*, with screw flanches 8, 8, outside and spiral plate 6, inside, forming a screw to force the grain between the stones, and also to prevent its jumping out of the eye, as the running stones and bail give the grain, or other material, a rotary motion *against* the direction of the stationary screw flanch, substantially as described and shown.

DAVID MARSH.
ELI B. NICHOLS.

No. 6835.—*Improvement in Wash Boards.*

Having thus fully described the nature and effect of my invention, I wish it to be distinctly understood that I do not claim any of the several parts composing a wash board made of sheet metal and wood; but that which I do claim as my new and useful improvement in the mode of manufacturing such wash boards, and for which I ask letters patent, is incising with the edges of the sheet metal, (prepared and crimped as described,) the legs or the legs and body board by the suitable application of pressure thereto, thereby fitting and attaching the one to the other at one operation, and with a comparatively water tight joint.

ORRIN RICE.

No. 6836.—*Improved Means for Working Sails.*

I do not claim to have invented any of the parts herein described, as separately from the manner in which it is employed, no one part is new; but I do claim as new and of my own invention, and desire to secure by letters patent of the United States, the attachment of a rope 8, to the bolt rope of a sail to act as a down haul in lowering, and to sheet the sail home when hoisting, such rope passing by sheaves, or blocks, or in any convenient manner from one end of the boom to the other, so that it operates to release the cringle and relieve the sail when lowering, and replace the cringle, and sheet home the sail when hoisting, substantially as described and shown.

WILLIAM A. ROSS.

No. 6837.—*Improvement in Electro-Chemical Telegraphs.*

We do not claim as our invention the train of wheels constituting the motive part of the marking instruments; neither do we claim to confine ourselves to any particular form of battery, or other generator of electricity which may be of any suitable form, several of which are well known and in common use.

We desire it to be understood that what we claim as new and of our invention, is—

Firstly. The mode of arranging the several parts of our marking instrument for electro-chemical telegraphs, substantially as herein before described.

Secondly. We claim the mode of adjusting a style, or point-holder, as herein before described and shown, so as to afford a ready and convenient mode of regulating the pressure of the style or point upon the surface of the chemically prepared fabric.

Thirdly. We claim the mode of applying the weight Q, for the purpose of regulating the pressure, as herein described and shown.

Fourthly. We claim the mode of arranging the marking and transmitting instruments, wires and batteries in a single circuit, and in branch circuits connected therewith, so that a copy of a message sent from any one station, may

be marked upon the chemically prepared paper or other fabrics at one or any desired number of stations in communication therewith, and also, if required, at the transmitting station, without requiring the use of any secondary current.

ROBERT SMITH.
ALEXANDER BAIN.

No. 6838.—*Improvement in Straw Cutters.*

What I claim as my invention and desire to secure by letters patent, is the operation of cutting and comminuting straw substantially as herein described and represented.

JONATHAN SULLIVAN.

No. 6839.—*Improvement in Springs for Carriages.*

I do not claim U springs in combination with elliptic ones; nor do I claim a spring pearch or reach. But what I do claim as my invention and desire to secure by letters patent, is the combination of the adjustable U springs with the bent spring reach, by bolting one end of said springs to said reach, and connecting the bend of said spring to the bent part of the reach by an adjustable link or clasp in the manner and for the purposes above set forth

WM. S. THOMAS.

No. 6840.—*Improvement in the mode of making Toothed Cylinders.*

I am aware that teeth have been fixed in solid blocks or cylinders of metal, and by boring holes in said cylinders and inserting and confining the teeth therein. Besides the difficulty of keeping the teeth in their proper places when so applied, such a method of making a cylinder of teeth becomes very expensive in comparison with that adopted by me. I am also aware that lead or other fluid metal, or other material in a molten or liquid state has been cast around one or more articles for the purpose of holding them in place. I do not therefore lay any claim to such modes or contrivances in the abstract; but what I do claim as my invention is the improvement in the mode of setting and adjusting the teeth of toothed cylinders, made substantially as herein before described, the said improvement consisting in the employment of the screw A, in combination with the external tube of paper or metal *b*, the said screw not only enabling me to set the teeth in a helix line, which presents great advantages in their operation, but to readily withdraw it (the screw) at the proper time and for the introduction of the cylinder B, as described.

J. L. TUTTLE.

No. 6841.—*Improvement in Transverse Callipers.*

What I do claim as my invention and desire to secure by letters patent, is the transverse callipers, having legs so formed and connected as to be inserted into the bung of a cask to ascertain its length from head to head, or its width from side to side, substantially as herein described.

W. J. VAN NESS.

No. 6842.— *Improved method of flooding and entering Powder Magazines.*

What I claim as my invention and desire to secure by letters patent, is attaching to and combining with the known magazine (having its ejection and injection pipes for flooding and continuing a circulation of cold water through it) and the governing cocks connected together; a connecting piece to be *effected by heat*, without necessarily coming in contact with fire, this connecting

piece being governed by a spring when not caused to operate; and being capable by the action of heat to flood the magazine. The whole being arranged or constructed substantially as herein more fully described. I also claim attaching and combining with the magazine a double tube or equivalent arrangement, by which articles may be conveyed into or from the magazine without in any way exposing the interior of the magazine to fire from without, by which several arrangements a perfect security is effected against firing the magazines of vessels of war, all of which is fully described herein.

CHAS. W. COPELAND.

No. 6843. — *Improvement in Lathes for turning.*

What we claim as our invention and for which we desire to secure letters patent, is the combination of the sliding cutter stock M, the friction wheel N, and two or more patterns, J, K, the spindle *a*, and the changing lever *p*, *p*, substantially as herein described, and for the purpose set forth.

ALLEN GOODMAN.
HAMMOND DOANE.

No. 6844. — *Improved arrangement of engine for useing Steam expansively.*

I do not wish to limit myself to the precise proportions or locations of the crank shaft, as these may be greatly varied within the principle of my invention without effecting the result except in degree. Nor do I wish to limit myself to the employment of all my improvements in connection, as important results can be obtained by either one of them separately, as for instance, obtaining an equal or nearly equal mechanical force on the first and second halves of the semi rotation of the crank when using steam expansively, by the principle involved in changing the position of the crank shaft, relatively to the axis of vibration of the beam, may be advantageously employed with only one engine for many purposes. The use of two engines with the cranks on the same shaft and on opposite sides of the centre, may be advantageously applied to obtain a more regular mechanical action on the crank shaft, by the use of expansive steam on two ordinary engines with or without the beams, without the use of the first or third branch of my invention.

What I claim as new is placing the axis of the crank shaft or single-acting beam engines in which the steam is applied expansively, nearer to a line parallel to the axis of the cylinder, and passing through the axis of vibration of the beam, on the principle herein specified, and for the purpose of obtaining a more regular mechanical action on the crank, by the application of the expansive principle of steam, as described.

I also claim the employment of two single action expansion crank engines, with their cranks on one and the same shaft, and on opposite sides of the centre, that is, at an angle of 180°, substantially as described.

And I also claim in expansion engines having two cylinders with pistons moving in opposite directions, and connected with cranks on opposite sides of the centre, in one of which the steam acts by expansion alone, having one end of the large or expansive cylinder at all times in connection with the condenser, and the other alternately in connexion with the condenser, and with the steam end of the smaller cylinder, that the large piston during its return stroke may have a vacuum on each side, as described, when this is combined with the smaller cylinder connected with the boiler, and so arranged as to have both ends in connection with one end of the larger or expansive cylinder, so that when the piston of the smaller cylinder is acted upon on one side by the

steam, there shall be a vacuum on the other side, and when the steam is acting by expansion on the larger piston, it shall be in connexion with both ends of the small cylinder, as described. I do not wish to be understood as claiming the mode of connecting the small and the large expansion cylinders when so arranged that the two pistons are connected and move together, and in the same direction, for this was known before, in what is known as the Leghwater engine, but I do claim it when arranged as and in the combination herein specified.

And thirdly, in combination with a two throw crank shaft, having the two cranks on opposite sides of the centre, the making of the second of the two engines so connected, of greater capacity. J. ERICSSON.

No. 6845.—*Improvements in Looms for weaving Figured Fabrics.*

Having thus fully described my improvements in working heddles, what I claim therein as new and for which I desire to secure letters patent, is first, operating the heddle frames by the direct application of a cylinder to them, substantially in the manner and for the purpose set forth; secondly, I claim the mode of changing the pattern by having several patterns on one cylinder, and at each operation turning the cylinder so far as to pass over the intermediate patterns, and bring the desired one under the heddle frames, as above described; and I also claim the apparatus for turning the cylinder, substantially as herein specified, whereby the cylinder can be turned through a greater or less arc, as may be required, substantially as herein described.

RICH'D GARSED.

No. 6846.—*Improvement in Mowing Machines.*

What we claim as our invention and desire to secure by letters patent, is the construction and use of the mortise or guide slot (4,) in combination with that for the axle of the driving wheel, for the purpose of allowing the wheel or thills, or both, to rise and fall without elevating or depressing the blades.

DANIEL K. HARRIS.
JOHN K. HARRIS.

No. 6847.—*Improvement in Corn Shellers.*

What we claim as our invention and desire to secure by letters patent, is constructing one or more of the bars of the concave in hinged sections (*h h h*,) which turn in an arc whose axis is at right angles to that of the cylinder, whereby the ears are subjected to opposite and oblique rubs, which facilitate the stripping of the grains from the cobs.

Second. Feeding the corn into the throat of the sheller by means of a fluted roll (C,) which delivers the ears with their axes parallel to that of the cylinder, whereby the breaking of the cobs is prevented, and the shelling is expedited.

Third. The employment of the hinged gate (D,) to prevent the ears from being fed into the sheller either endwise or too rapidly.

DARIUS W. HARRIS.
EGBERT P. CARTER.

No. 6848.—*Improvement in Winnowing Machines.*

Having thus fully described my improved seed cleaner, what I claim therein *as new*, and for which I desire to secure letters patent, is the combination and

arrangement of the horizontally sliding screen and shaking shoe, operated in the manner and for the purposes set forth.

A. J. HOWELL.

No. 6849.—*Improvement in Regulators.*

What I claim as my invention and desire to secure by letters patent, is the combination and arrangement of the radial arms (*a*,) and arms C, arranged in pairs, spiral springs D D′, surrounding the same, fan wings F, and segments E, of a rim of circular curb, for regulating the speed of machinery, substantially in the manner herein set forth.

J. F. MASCHER.

No. 6850.—*Improvement in Harness Hames.*

What I claim as my invention and desire to secure by letters patent, is the giving the inner edges of harness hames a concave form, for the purpose of enabling them to be fitted with much greater accuracy to the roll upon the collar, and thereby securing them against displacement, substantially as herein set forth.

CHARLES POPE.

No. 6851.—*Improvement in Rice Hullers.*

What we claim as our invention and desire to secure by letters patent, is—

First. The employment of rows of brushes on a rotating stock, in combination with a surrounding wire gauze cylinder, when the said rows of brushes or rubbers are made with their forward edges bevelled, or with the equivalents thereof, substantially as described, whereby the entrance of the rice or other grains between the brushes and the surrounding cylinder is insured, as described.

Second. The rows of inclined feeders or conductors, in combination with and interposed between the rows of brushes or rubbers, substantially as described, for the purpose of conveying the rice or other grain through the machine, as described; and this is claimed in contradistinction to inclined feeders or conveyors used at the end of the brushes.

Third. The rubbers made of India rubber at the feeding-in end of the machine, in combination with the brushes, substantially as described, for the purpose of hulling the grain, preparatory to the operation of the brushes.

Fourth. The polishers, made of lamb's wool, or other equivalent substance, at the delivery end of the machine, in combination with the brushes, substantially as described, for the purpose of polishing grain preparatory to its delivery, as described.

Fifth. Connecting the brushes with the stock, by adjustable means, substantially as described, for the purpose of adjusting the periphery of the brushes to the wire gauze cylinder, as described.

And, finally, making the inclination of the face of the feeders or conveyors adjustable relatively to the axis, substantially as described, for the purpose of regulating the passage of the grain through the machine, substantially as described.

D. H. SOUTHWORTH.
JAMES R. HITCHCOCK.

No. 6852.—*Improvement in Pendulum Balances.*

Having thus fully described my improvements in pendulum balances, what I claim therein as new and for which I desire to secure letters patent, is the combination of a pendulum balance, having a wing or fan attached thereto, to prevent its vibrations, substantially as described, with the adjustable counterbalance platform for weighing, interposing the chain and cam in the manner set forth.

I claim, also, in combination with the above apparatus, the scale for small weights, so arranged in connection with the levers of the platform scales as to have the same index indicate the weight of articles placed on either the large or small balance.

And, lastly, I claim the arrangement of the platform levers, both working in one direction, with the adjustable weight appended thereto.

ELNATHAN SAMPSON.

No. 6853.—*Improvement in Seed Planters.*

What I claim as my invention and desire to secure by letters patent, is—

The combination of the spring catch *f*, with the levers *d*, substantially in the manner and for the purpose herein set forth.

The combination of the device (consisting of the rod *h*, connected with the short arm of the lever *d*,) for opening and closing the register *g*, with the devices for gearing and ungearing the seed roller, and raising and depressing the drill teeth, as described.

JOHN W. SHERMAN.

No. 6854.—*Improvement in Grease Boxes for Axles.*

What I claim as my invention and desire to secure by letters patent, is the auxiliary oil cup, in combination with the cup which holds the cotton waste or other fibrous substance under the journal, when said combination is effected by means of the partitions, substantially as herein described.

JOHN M. SMART.

No. 6855.—*Improvement in Carpet Cleaning Machines.*

What I claim as my invention and desire to secure by letters patent, is the application of the recoil strokes of elastic rods from tension, as described, to successive portions of a carpet or other fabric, moved over rollers in sliding frames, made adjustable by means described, by means of which the carpet or other fabric is rapidly and smartly beaten, and thereby cleansed from its dust and other impurities, and otherwise improved.

JOSEPH WENTWORTH.

No. 6856.—*Improvement in Tailors' Measures.*

What I claim as my invention and desire to secure by letters patent, is the arms B and C, in the symetrical rule, in combination with the dial plates *f* and *g*, to which they are attached by pivot joints, and herein described and represented.

JAMES M. WHITHAM.

No. 6857.—*Improvement in Apparatus for raising and carrying Water.*

What I claim as my invention and desire to secure by letters patent, is the arrangement and operation of the cord *l*, that is to say, passing it round

a pulley at or near the highest part of the track, substantially as herein set forth, whereby the carriage can surmount any elevation intervening between the well and the point where the water is to be delivered, without the use of a return cord.

J. D. WILLOUGHBY.

No. 6858.—*Improved File Supporter.*

What we claim as our invention and desire to secure by letters patent, is the combination of the yielding guide rolls for supporting a hand file during the operation of sharpening the teeth of saws, with the adjustable clamp stock on which they are mounted, substantially as herein set forth.

JEROME B. WOODRUFF.
BENJAMIN M. TOWNSEND.

No. 6859. — *Improvement in Fire Engines.*

What I claim as my invention and desire to secure by letters patent, is the combination of the horizontal vibrating brakes G H, with the engine A B C D, said brakes being so constructed and arranged that any desired number of hands may conveniently apply their united power to the alternate action of the pistons, whilst standing upon the ground in parallel rows, at right angles to the sides of the engine. The handles or propelling rods being so connected with the brakes that they can be brought parallel with and connected to them, so as not to extend beyond the sides of the engine, when the latter is not in use, by which the advantages enumerated in the foregoing specification are obtained.

JOHN B. TARR.

No. 6860. — *Improvements in Hemp Machines.*

Having thus fully described my improvement in breaking and cleaning hemp and flax, and other fibrous substances, what I claim therein as new and for which I desire to secure letters patent, is the combination of the grooved rollers, brake and scutchers, or scrapers, substantially in the manner and for the purpose set forth.

I also claim the scrapers when employed with any other feeder that shall hold the material firmly while being scraped.

JAMES ANDERSON.

No. 6861. — *Improvement in Pessaries.*

What I claim as my invention or improvement in the pessary, and desire to secure by letters patent, is the attachment of two stems by hinges to a circular rim, and which two stems may be combined into one stem with two branches by means of a tube or socket to be slid upon the lower end thereof, in the manner herein before fully set forth.

JOSIAH B. ANDREWS.

No. 6862.—*Improvement in Portable Water Closets.*

Having now described my improvements in the construction of water closets, I will proceed to state what I claim and desire to secure by letters patent. What I claim therefore, is the construction and use of the arrangement of levers G H I J & K, in combination with and operated upon by the foot and seat boards of a water closet, for the purpose of opening the pan M, in the lower basin or trap of a water closet, and regulating the supply of water to

the closet reservoir, also the construction and use of the levers S^1 S^2 S^3, and weighted lever T, in combination with the foregoing arrangement of levers, and operated upon by the seat board for continuing the operation of supplying the water to the basins from the closet reservoir.

CHARLES C. BIER.

No. 6863.—*Improvement in Cast Iron Car Wheels.*

What I claim as my invention and desire to secure by letters patent, is the combination of the curved hollow arms B, with the hollow rim, the A, made semicircular on its inner part and hollow curved hub D, enlarged and forming a continuation of the faring of the inner ends of the arms, for causing all the parts of the wheel to accommodate themselves to each other in shrinking or cooling, substantially in the manner and for the purpose herein set forth.

THOMAS S. BOURSHETT.

No. 6864.—*Improvement in Binder Pullies for Belts and Brakes.*

Having thus fully described my improvements, what I claim as my invention and for which I desire to secure letters patent is—

First. To communicate power to machines used for extracting liquids from other matter by means of a moveable binder pulley and a slack belt, the binder pulley being pressed upon the belt by means of a shifting weight, as herein described.

Second. To attach to the same part to which is connected the binder pulley, the friction strap or brake, so that by the same movement that the binder is taken from the belt, the brake is brought to act upon the machine, to stop it by the means herein described.

MERTOUN C. BRYANT.

No. 6865.—*Improvement in Ice Cream Freezers.*

Having thus fully described the nature, construction and operation of my invention—

What I claim therein and desire to secure by letters patent, is freezing cream or other liquids by forcing through them currents of air chilled by passing them through chambers artificially cooled, substantially as set forth.

G. COFFEEN, Jr.

No. 6866.—*Improvement in Seed Drills.*

What I claim and desire to secure by letters patent, is the controling of the springs M, by means of the ring K, in the manner and for the purpose herein set forth.

D. CUSTER.

No. 6867.—*Improvement in Curling Hat Brims.*

I do not herein claim to have invented the steam heater C; nor to be the first who has employed the shaping cloth *b*, with the spring 3, and cord 4, nor do I claim to have invented any one of the mechanical parts described as used herein, irrespective of the manner, in which I have adapted, applied or combined them for these purposes, except the entire curler piece *c*, which I have been the first to invent and use.

But I do claim as new and of my own invention, and desire to secure by letters patent of the United States—

First. The exclusive application of a changeable curler or former piece *c*, that entirely surrounds the hat crown, and acts on the whole of the brim; and the

ombination therewith of the pieces *d d*, yoke *e*, swinging standard *k*, cam *o*, nd lever *p*, to hold a hat in such a manner that the workman may iron and nish the curl on the edges of the brim at one operation, effected substantially s described and shown.

Second. The combination with the foregoing parts of the winch *h*, lines 7, and hooks 8 8, to draw or turn the cloth *b*, on and over the edges of the at brim, and turn the edges of the hat brim over the edges of the curler piece , and hold them there while the workman irons them, so as to set them in he required form, substantially as described and shown.

Third. I claim the application of the metal cooler piece *r*, for the purpose f cooling the hat brim so rapidly that the brim shall not have time to warp r change the form previously given to it, the shape of such cooler being conormable to the size and shape of the hat brim, so as to present an even earing to the under side of the hat brim while cooling, substantially as decribed and shown.

FRANCIS DEGEN.

No. 6868.—*Improvement in Regulators for Water Wheels, &c.*

I do not claim the conical drums, endless belt and governor, these having een long known as a means of changing speed; but I claim as my invention he employment of these or analogous arrangements in connection with the oose cog wheel C, herein described, as the means of causing the revolution f said cog wheel to exceed or fall short of the revolution of said water mill r first mover, whenever such water mill or first mover shall exceed or fall hort of its proper speed; the consequence of this variation through the agen- y of the screw K, bell crank *o h*, and moveable plate (which parts I also laim in combination with those above mentioned) being either to enlarge or ontract the jet apertures, and thereby to increase or diminish the speed of uch water mill or first mover, in accordance with the necessities of the case; nd this I claim under an arrangement substantially the same with that herein ully set forth, not intending however, to limit myself to the particular form nd connection of the individual parts, but to vary these as I may find expelient, whilst I attain the same end by analogous means.

JAMES FINLAY.

No. 6869.—*Improvement in Machinery for turning Right and Left Lasts.*

We do not claim to be the original inventors of the principle of cutting and urning lasts or other irregular formed bodies, by means of a series of revolvng cutters, guided by a pattern or model corresponding in form with the rticle to be cut or turned, as this principle is common property, and has been or many years; but what we do claim as our invention and desire to secure y letters patent, is—

First. The mode of cutting a right and left last (or other article) simultaeously from a single reverse pattern and two blocks of wood, by the before lescribed combination and arrangement of a reverse model tracer wheel and ingle wheel of rotary cutters, moving in opposite directions, the tracer wheel eing in contact with the reverse model, whilst the cutters turn between the wo pieces of wood to be turned into a right and a left last, the latter turning imultaneously in opposite directions, inward or outward against the cutter wheel.

CHARLES HARTSHORNE.
WM. B. SHAW.

No. 6870.—*Improvement in Connecting Hubs to Axles.*

What I claim as my improvement and desire to secure by letters patent, is the introduction of the rod *f*, with the nib *e*, working into the cavity K, in the manner and for the purposes herein set forth.

JOHN KELLOGG.

No. 6871.—*Improved Safety Sliding Breech Fire Arm.*

What I claim as my invention and desire to secure by letters patent, is first, the method of locking the breech pin when inserted to prevent it from turning, by means of the sliding bar, substantially as described; and this I also claim in combination with both or either of the methods of securing the breech pin by the screw thread and the inclined face of the breech pin tube, substantially as described.

Second. Combining with the sliding breech pin and the discharging punch which slides therein, or the carrier thereof, the spring catch for holding the punch back during the operation of loading, substantially in the manner and for the purpose specified; and I also claim this method of holding the discharging punch in combination with the connection of the punch or the carrier thereof, with the trigger, substantially in the manner and for the purpose specified.

Third. The combination of the sliding bar, which locks and unlocks the breech pin, with the catch of the breech pin, which holds and liberates the discharging punch, substantially in the manner and for the purpose specified.

C. HARTUNG.

No. 6872.—*Improved means of changing the combination in Revolving Tumbler Locks.*

What I claim as my invention is hanging the series of rotating tumblers in a hinged or vibrating frame, their outer periphery being provided with cogs which gear into the cogs of the series of tumblers connected with the stationary lock plate, so that when the said frame is elevated, the tumblers of the other series will be free to turn, in order to suit any variation in the set of the key.

LEWIS LILLIE.

No. 6873.—*Improved Method of fitting the Heaving Socket and Head of Windlasses.*

I am aware that bosses, having both square and round parts, have been used for other and different purposes, and in some cases for purposes apparently similar; but I do not know of any instance in which the application of such bosses admits the removal of either separately, or both of the parts of a machine, when either or both are injured so that either or both may be immediately replaced by new parts; nor do I know of any instance in which the application of such parts is at once combined with a saving of expense, and an additional security for life and property, as is the case in the present instance; I therefore do not claim any of the parts herein described and shown, irrespective of the manner in which I have applied them to attain these objects.

But I do claim as of my own invention and desire to secure by letters patent of the United States, as new and useful in effect, the application of the boss *c*, with the wrought metal band 2, and square 1, acting with the bush *e*, to connect the windlass head B, with the shaft *b*, and at the same time sup-

port the heaving socket and flanch, in such a manner that either the head or the heaving socket and flanch, or both, can be immediately replaced when injured; the whole constructed and operating substantially as described and shown.

CHARLES PERLEY.

No. 6874.—*Improvement in Machinery for Splitting and Dressing Rattans.*

What I claim as my invention and desire to secure by letters patent, is the principle and combination of the vibrating cutter and guide, to use any number required to remove the whole surface of the cane or rattan, dividing the surface into any required number of strands.

SYLVANUS SAWYER.

No. 6875.—*Improvement in Leather Dressing Machines.*

Now what I claim as new and of my invention and desire to secure by letters patent, is—

First. The *adjustable* endless apron in combination with the scraper or extender, for the purpose and uses as herein described; and

Second. I claim the *adjustable* scraper or extender, as described, for the purposes and uses of leather dressing, as herein set forth.

CHARLES SLAWSON.

No. 6876.—*Improvement in Brick Presses.*

What I claim as my invention and desire to secure by letters patent, is—

First. The combination of the revolving conical duster (*x*,) with the rotating, moulding and pressing wheels (B, C,) constructed, arranged and operated in the manner and for the purpose herein set forth.

Second. I also claim the combination of the rotary toothed wheel (J,) with the moulding wheel B, for driving the pistons to the bottom of the moulds, after the bricks are discharged therefrom, constructed, arranged and operated in the manner and for the purpose herein described; said wheel being turned by the action of the moulding wheel in contact therewith, without the aid of any connecting cogged or band gearing.

Third. I also claim the manner of increasing the pressure on the clay whilst in the moulds, to form the brick, by diminishing the distance between the peripheries of the moulding and pressing wheels, by causing the pressing wheel to descend in the arc of a circle (13,) of a radius greater than the semi-diameter of the moulding wheel, the bearings or boxes of the axle of the pressing wheel, being secured to the parallel beams (*i*,) whose outer ends are made to rise in the arc of a circle concentric to the arc (13,) by means of vertical screws (*h*,) arranged to bear against the under sides of said beams to raise or lower the pressing wheel C, in order to increase or diminish the pressure on the bricks in the moulds, as aforesaid.

FERDINAND ZISEMANN.

No. 6877.—*Improvement in Chronometers for Longitude.*

What I claim as my invention and desire to secure by letters patent, is the dial with four hands, which are at right angles to each other, and revolve once in 24 hours; said dial being divided into hours and degrees, substantially in the manner and for the purposes above described.

JOHN SHELDON.

No. 6878.—*Improvement in Ox-yokes.*

But what I do claim and desire to secure by letters patent, is the pinion F, and rack bars G, G, working within the beam, in the manner and for the purpose set forth.

Second. I also claim the two iron plates N, N, as set forth.

I also claim the grooves L, and tongue K, in the manner and for the purpose set forth.

JOHN CHASE.

No. 6879.—*Improvement in Scythe Snaths.*

What I claim as my invention and desire to secure by letters patent, is curving forward that portion of the snath between the right hand nib or thole and the extremity to which the scythe is attached, in such manner as to form an obtuse angle between the scythe and snath at the point where they are joined, by which device the left hand and arm are extended forward, (previous to the scythe's entering the grass,) so that the labor of cutting is performed as much by drawing in the left arm as by forcing around the right, at the same time the position given the scythe allows it to cut the whole length, and is more easily sharpened at the heel with the rub stone than scythes hung on ordinary snaths.

LUTHER COLE.

No. 6880.—*Improved Auger for Boring Earth.*

We do not claim to be the original inventors of an auger for boring in the earth; but what we do claim as our invention and improvement and desire to secure by letters patent, is the peculiar construction of the auger, as aforesaid: namely, the combination of the spiral lip or shelf B, extending the whole, or nearly the whole length of the spiral twist A, with the said spiral twist A, which is made to approach the centre gradually till it intersects the shaft or stem C, forming an auger of a shape approximating to that of a frustum of a cone, and being entirely open at the lower end.

ASHLEY CRAFTS.
EBENEZER WEEKS.

No. 6881.—*Improvement in Distilling and Rectifying Spirits.*

I do not wish to confine myself to the special construction of the apparatus herein described, as this may be variously modified without changing the principle of my invention; but what I claim as my invention and desire to secure by letters patent of the United States, is the method of purifying and rectifying spirits, or giving any desired scent or flavor thereto, by causing the vapor of spirits to pass through a partial cooler containing the required substances for purifying, rectifying and impregnating it, substantially as described, whereby the vapor of spirits in passing through the said apparatus, under the combined action of partial cooling, is concentrated and purified, and separated from water, and the substances employed for imparting odors or flavors, as described, and this I claim irrespective of the kind of substance or substances, separately or connectedly, which may be used for producing the chemical effects on the spirit vapor.

CARL FALKMAN.

No. 6882.—*Improvement in Machines for Moulding Brick.*

What I claim as my invention and desire to secure by letters patent, is the combination of the slotted bar K, with the levers I, P, pin or bolt *(d,)* cranks J, N, secure to the horizontal transverse shafts H, M, connecting rods O O, attached to presser F, and cogged sector *b*, and rack G, on carriage for causing the presser to be raised in the moulding box simultaneously with the movement of the filled moulds from under the moulding box, substantially as herein set forth.

JOHN W. FROST.

No. 6883.—*Improvement in Ink Fountains.*

Having thus described my invention, what I claim as my invention and desire to secure by letters patent, is the mode of supplying the pen or marking instrument with ink, by the pen or marking instrument acting upon the valve or stopper of the ink fountain, to allow the ink to ooze out of the same when in the act of writing or marking, in the manner substantially as herein described.

ELIJAH. JORDAN.

No. 6884.—*Improvement in Combined Table and Bedstead.*

What I claim as my invention and desire to secure by letters patent, is—

First. The table leaves A, A, No. 2, in combination with the folding side pieces B, B, B, B, for converting a dining table into a bedstead, as described.

Second. I claim the middle leaf C, of No. 1, with folding legs A, A, as seen in No. 3, in the manner and for the purposes described.

Third. I also claim the construction and use of the moveable towel frame D, of No. 2, in combination with the head board, as described.

Fourth. I also claim the construction of the apparatus for washing stand and ottoman or support on the table, as described.

FRANK LESLIE.

No. 6885.—*Improvement in Seed Drills.*

Having thus fully described my improvements, what I claim therein as new and for which I desire letters patent, is—

First. The combination of the plane pullies *b*, mouth pieces and slides *g*, operating as above set forth, for regulating the discharge of the grain.

Secondly. I claim the conical plates *p*, at the lower end of the tubes for distributing grain.

JACOB MUMMA.

No. 6886.—*Process for making Malleable Iron direct from the Ore.*

What I claim as my invention and desire to secure by letters patent, is the process of manufacturing iron directly from the ore, in a furnace composed of three combined chambers, one above another, all actuated by the same fire, whereof the upper chamber is used for heating and deoxidizing, the middle chamber for fluxing and working, and the lower chamber for reducing and finishing the iron, substantially in the manner and for the purposes herein set forth.

M. SMITH SALTER.

No. 6987.—*Improvement in Connecting Hubs with Axles.*

We do not claim confining hubs to axles by a spring catch on the one working in a groove in the other, this having already been done; but what we do claim as our invention and desire to secure by letters patent, is the fastening a wheel hub to its axle by means of an annular groove *(j,)* near the extremity of the axle journal (B,) and a sliding retaining plate *d*, and a spring guard pin *i*, placed within the cap (C,) made fast to the outer end of the hub (A,) to wit: a curved portion of the said retaining plate *d*, being forced by the spring *f*, into the groove *j*, in the axle journal, and securely retained when in that position by the spring guard pin *i*, substantially in the manner herein set forth.

ELNATHAN SAMPSON.
A. M. BILLINGS.

No. 6888.—*Improvement in Hemp Brakes.*

What I claim as my own invention and desire to secure by letters patent, in the above described circular indented platform mill, with horizontal surface, is the circular indented platform, with the application of the bevel indented roller or rollers, on this horizontal circular indented platform, which gives a coarser and a finer brake to suit any thickness of stock, from the coarsest hemp to the finest and most delicate flax, and that it is capable of being extended to any diameter, to receive any number of rollers of any desired weight, and to do any amount of business by the application of any motive power, and the model is intended to show simply the form and position of the bars on the platform and the form and application of the rollers, viz: it is only intended to show the *principle* and not the mechanism or most convenient mode of application, as the mechanism and mode will vary in almost every instance.

AUGUSTINE SMITH.

No. 6889.—*Improvement in Sounding Boards for Piano Fortes.*

I am aware that two sounding boards have been framed together and confined to the frame work of a piano; I do not therefore claim to be the inventor of a double sounding board; but what I do claim as my invention and desire to secure by letters patent, is the combination of a sounding case with the ordinary sounding board of a piano (suitably perforated with sound openings,) substantially in the manner and for the purpose herein set forth.

RICHARD SWAN, Jr.

No. 6890.—*Improvement in Welt-cutting and Splitting Machines.*

I therefore claim the combination and arrangement of the two short cylinders I, K, the knife M, and chisel N, arranged at one end of an ordinary leather splitting machine, substantially in the manner and for the purpose of forming strips of leather, and cutting them into welts at one and the same time, and from larger pieces of leather, as specified.

JOHN E. TUCKER.

No. 6891.—*Improvements in Curvilinear Saw Mills.*

I do not wish to limit myself to the precise arrangement and construction of the various parts, as these may be varied without changing the principle of my invention; as for instance, only one rock shaft may be used for giving the

vibratory motions to the saw guide, although I prefer the use of two, and instead of the chains and pulleys, connecting rods jointed to arms, may be substituted, but as these variations are familiar to the machinist, it is unnecessary to enumerate them.

What I claim as my invention and desire to secure by letters patent, is hanging the saw gate to slide in fender posts framed together, and sliding horizontally, to give the required lateral movements to the saw, substantially as described, when this is combined by rack and pinion, with a shaft and hand wheel, or the equivalent thereof, under the control of the attendant, substantially as described.

I also claim in combination with the above described method of hanging the saw gate, to give it the required lateral movements, connecting the pitman or pitmen with the saw gate, by means of a horizontal rod or rods on the saw gate, and governing the upper end of the pitman or pitmen, by a guide or guides, substantially as described.

I also claim the method substantially as herein described, of vibrating the saw by means of a rock shaft or shafts, connected therewith, and hung in the saw gate, in combination with the pulley or pulleys, or the equivalent thereof, through which the shaft or shafts slide, as described, the said pulley or pulleys, or the equivalent thereof, being combined with a crank handle, or its equivalent, on some stationary part of the framing, as described.

And finally, I claim in combination with the rock shaft or shafts, the vibrating saw guide connected therewith, substantially in the manner and for the purpose specified. THOMAS DUGARD.

No. 6892.—*Improvements in Flood Gates for Fences.*

I do not claim the barrel, rollers, and pulley, as my invention when used separately; but what I do claim as my invention and desire to secure by letters patent, is the combination of all the parts with the frame work above described, so combined and applied as to produce the self-working flood gate as above described. STEPHENS D. HOPKINS.

No. 6893.—*Improvement in Sofa Bedsteads.*

What I claim as my invention and desire to secure by letters patent, is the letting of the upholstered part of the back fall forward to meet and rest against the rear or back edge of the seat, to form the bed without moving the sofa from its face, or disturbing any part of the frame, as described.

JOHN A. ROBSON.

No. 6894.—*Combination of a Double Travelling Hearth with a Blast Furnace.*

Having thus fully described my improvement, what I claim therein as new and desire to secure by letters patent, is the combination of the double travelling hearth with a blast furnace, in the manner and for the purpose as herein set forth. LORENZO SIBERT.

No. 6895.—*Improvement in Platform Scales.*

My invention or improvement, and that which I claim as new, is the combination of the pivot or bearing frame, or primary platform, the blocks of rubber or spring contrivances, and the superior platform with the weighing levers or mechanism, the whole being substantially in the manner and for the purpose as specified. THADDEUS FAIRBANKS.

No. 6896.—*Improvement in Machines for Folding Paper.*

What I claim as my invention and desire to secure by letters patent, is folding sheets of paper, or other flexible substance, by machinery made and operated substantially upon the principle herein set forth; that is to say, by striking the paper or other substance, upwards in the line in which the fold is to be made, from a surface on which it has been extended, and seizing it between converging surfaces which complete the fold and deliver the folded paper, irrespective of the number or forms of the surfaces employed, and of the number or forms of folding edges required to give the requisite number of folds to the paper; irrespective also of the arrangements and devices for operating the several members of the machine.

EDWARD N. SMITH.

No. 6897.—*Improvement in Flour Bolts.*

What I claim as my invention and wish to secure by letters patent, is the arrangement of the bolting cloths upon a reel of any convenient construction, in such manner as to run the meal over the coarse cloth first, and the use of zinc or other metallic substance in and about the bolts to operate as a cooler upon the flour, after it is separated from the bran and shorts.

GEORGE W. BROWN.

No. 6898.—*Improvement in Butter Working Machines.*

What I claim as my invention and desire to secure by letters patent, is the use of two or more rollers, with adjustable scrapers, held in contact with the rollers by springs, or other devices, operating in a vat of running *water*, to wash butter and separate the broken capsules, cheesy matter, butter-milk, and other impurities, by dissolving those that are soluble in water, and washing away those that are not soluble, substantially as described; the water being let into the vat from a cistern placed above the level of the vat, and escaping at the spout T, on a level with the journals of the rollers.

ELIAS H. MERRYMAN.

No. 6899.—*Improvement in Brick Presses.*

We are aware that the mere employment of a ram or falling weight to produce density is not new; consequently we do not claim such—nor do we claim as our invention, the combination of the percussion ram and its piston, (whether connected to it or separated from it,) the brick mould and lower expulsion piston H, the whole being made to operate in such manner on clay in the mould as to compress said clay and afterwards expel it from the mould; but we do claim as auxiliary thereto and in combination therewith, machinery for holding the ram and its piston stationary, (just subsequent to its first blow,) and elevating the lower piston in the mould, in order to produce direct compression on the lower face of the brick, in manner and for the purpose as above stated; the machinery employed for such purpose being the forked slide bar U, its projection, the projection on the ram and the cams, which operate the slide bar and lower piston, as specified.

We wish it understood that we make no claim to a sliding mould charger, in connection with a mould and hopper, as constructed and made to operate prior to the date of our invention; but what we do claim as our improvement, *is to* so construct and use the sliding charger, in connection with the

ram piston, as above specified, as to render it (the said charger) a part of the mould during and for some time after the *first percussion* of the ram, the same being for the purpose of attaining certain advantages we have above maintained.

We further claim the weighted or spring scraper *c'*, in its combination with the carriage C, and the mould plate E, and for the purpose of cleaning the top surface of the mould plate, as described.

We also claim, as a further improvement, to so construct the mould with the flaring or inclined sides, and combine them with mechanism for lifting the brick a short distance, just previous to the *second* percussion, as specified, as to not only enable the brick to be freed in a measure from its adhesiveness to the mould, but to permit the compressed air, or part of the same, in the immediate vicinity of the surface of the edges of the brick to escape, as explained, the diminution of adhesiveness tending to lessen the friction of the clay against the sides of the mould under the second percussion of the ram.

ARAD WOODWORTH, 3d.
SAMUEL MOWER.

No. 6900.—*Improvement in Processes for the Manufacture of Sugar.*

Having thus decribed the nature of my invention, and the manner in which the same is to be performed, I would remark, that I do not confine myself to the precise details, so long as the peculiar character of my invention be retained; but what I claim, is the combined use of sulphurous acid with lead in the manufacture and refining of sugar, substantially as herein set forth.

JOHN SCOFFERN.

No. 6901.—*Improvement in Railroad Trucks.*

Having thus described the nature of my invention, what I claim therein as new and desire to secure by letters patent, is the arrangement and combination of the journal boxes *(c,)* with the spring casing or pockets *(b, b,)* through which bolts are affixed to the frame, and acting as guides to the boxes, the whole being constructed and arranged in the manner and for the purpose substantially the same as herein specified.

JOHN F. ROGERS.

No. 6902.—*Improvements in Machinery for Dressing Flour.*

Having described the construction of our improved machine for separating the flour adhering to the bran, after the usual bolting operation has been performed in flouring mills, what we claim as our invention and desire to secure by letters patent, is—

First. The employment of a revolving hanging disc, of concentric rows of metallic polygonal beaters or cutters, and central hollow suspended shaft, made with curved induction and eduction branch tubes, said hollow shaft serving a double purpose of a hanging shaft and air conductor, for conveying streams of air to the space between the cylinders, in combination with a revolving disc turning in a contrary direction, also armed with concentric rows of metallic polygonal beaters and cutters, and radial wings arranged and operating in the manner and for the purpose herein fully set forth.

Second. We also claim the employment of the helical plate, in combination with the cylindrical bolt for producing the gradually enlarged space

into which the flour is received, and from which it is discharged, in the manner herein described.

We make no claim to the arrangement of the bolting cloth, and the other parts that are in other bran dusters in use.

CHARLES LEARNED.
STEPHEN HUGHES.

No. 6903.—*Improved form of Teeth in Harvesting Machines.*

What I claim as my invention and desire to secure by letters patent, is an *open triangular tooth or triangular hollow tooth* for cutting grass and grain, with its results, as herein described.

E. B. FORBUSH.

No. 6904.—*Improvement in Instruments for Milking Cows.*

Having now described the mode of making and operation of my invention, I will proceed to state what I claim and desire to secure by letters patent; what I claim therefore, is the sack A, made of any suitable material (gutta percha is preferable however) in combination with the elastic strap B, for compressing the teat, and neck of sack, and the exhauster tube E, and piston G, in form and manner, and for the purposes herein substantially set forth.

CYRUS KNAPP.

No. 6905.—*Improvement in Blank Account Books.*

What I claim as my invention, and desire to secure by letters patent, is connecting the leaves of a book with the cover, by means of a hinged strip attached to the back of the book and to the cover, so that they can be connected or disconnected by means of wires passing through the eyes or knuckles of the hinge strips, substantially as described, whereby the book can be disconnected from or connected with the cover, as described.

And I also claim making a book in sections, when the sections are provided with hinged strips, substantially as herein described, so that they can be connected with or disconnected from each other, and cover, substantially as described.

CHARLES HOPKINS.

No. 6906.—*Improvement in Rotary Pumps.*

What I claim as my invention, and desire to secure by letters patent, is the construction of each arm of the piston in such manner that while it is ordinarily kept in its proper position by the pressure of the water, its lower edge will yield to and pass over an obstruction which would otherwise break the pump.

PETER SWEENEY.

No. 6907.—*Improvement in Glazing Pottery Ware.*

What I claim as my invention, and desire to secure by letters patent, is the coloring of the glaze of pottery ware, by means substantially as herein set forth and described.

C. W. FENTON.

No. 6908.—*Improvement in Combined Plough and Seed Planter.*

Having thus described the nature of my invention, and pointed out the manner of using the same, and shown that by its peculiar construction and use in combination with a common single furrow plough, that one ploughing *of the* ground is saved, I hereby declare that I do not claim any of the indi-

vidual parts of the plough and seeding apparatus; but what I do claim as my invention and desire to secure by letters patent, is the construction of the seed planter as described, consisting of a seeding apparatus combined with a single furrow plough, as described, so as to sow the grain at the first or second ploughing, in the manner and for the purpose herein fully set forth.

WILLIAM CROASDALE.

No. 6909.—*Improvement in Boring Machines.*

What I claim as my invention and desire to secure by letters patent, is the combination of three principles, namely; first, the manner in which the bed piece (to which the carriage is connected) is raised or lowered, as before described; second, the manner in which the bed piece may revolve to set the auger at any angle or degree; third, the manner in which the auger is withdrawn by the direct motion of the crank.

JAMES H. ALDRICH.

No. 6910.—*Improvement in Stop Cocks and Filters in Combination.*

What we claim as our invention and desire to secure by letters patent, is an improvement on the filtering cock, secured to us as aforesaid, is the arrangement of the water passages in the central pipe in combination with the filters having two chambers with a water passage leading from each chamber, and a recess, substantially as herein described, whereby filtered or unfiltered water can be drawn, and the filtering action reversed, as described.

ABRAM JOHNSON.
HENRY JOHNSON.

No. 6911.—*Improvements in Machinery for Twisting Shawl Fringe.*

Having thus described my invention, I shall state my claims as follows:—

What I claim as my invention and desire to have secured to me by letters patent, is—

First. Dividing the yarns into proper quantities for the formation of the two strands, by means of the dividing plates and separator, shaped and made to slide up and down, substantially as herein above set forth.

Second. I claim twisting the *two* strands separately first, and then together by means of the twisting fingers or rubbers, constructed and arranged so as to turn inwards and outwards over each other, one above and the other below the yarns, substantially as herein above set forth.

Third. I claim the peculiar construction and arrangement of the separator, (as I have termed it) so that it may open over the rubbers, and drop down just before the two strands are to be twisted together, substantially as herein before described.

Fourth. I claim a machine for twisting the fringes of shawls, &c., having a stretching frame, dividing plates and separator, twisting fingers or rubbers, combined and operated successively as herein before specified and described.

MILTON D. WHIPPLE.

No. 6912.—*Improvement in machinery for dressing Barrel Heads.*

What I claim as my invention, and desire to secure by letters patent, is the application of the shield with the orifice and rest, attached to the same in combination with the plane K, to prepare the large bevel.

TIMOTHY SHEPARD.

No. 6913.—*Improved method of regulating the blow-off valve of Steam Boilers.*

What I claim as of my own invention and improvement, and desire to secure by letters patent, is regulating the "blow-off" water, by the action of the "feed" water, so that said "blow-off" water will always bear a certain proportion to the quantity fed, which ratio must vary according to circumstances and so as to cease entirely when the "feed" ceases to enter the boiler; secondly, I claim the combination of the "blow-off" valve with the check valve in such manner that the "blow-off" valve will be operated by the stem of the check valve, the whole being arranged and constructed substantially in the manner and for the purpose set forth herein.

CHAS. W. COPELAND.

No. 6914.—*Improvement in Propellers.*

What I claim as my invention and desire to secure by letters patent, is the propeller constructed of spiral curvilinear, tapering plates, formed and secured to the shaft as represented and described, and connected together at their outer extremities, and this I claim irrespective of the number of sets of these propellers, that may be placed on one shaft or of the number of shafts that may be used in propelling one vessel.

JOHN PATCH.

No. 6915.—*Method of ringing Fog-bells, and an adjustable clapper for the same.*

What I claim as my invention and desire to secure by letters patent, is indicating to vessels the position of channels, shoals or reefs, the depth of water, or state of the tide or currents at the entrance of harbors or elsewhere, by the varying ringing or tolling of a bell operated by adjustable machinery, substantially as herein set forth.

I also claim the combination of a shifting weight with the clapper, whereby its blows upon the bell in the several positions in which it strikes the same are equalized.

DANIEL JONES, Jr.

No. 6916.—*Improvement in Mills for Grinding Bark.*

Having thus described the construction and operation of our bark mill, what we claim therein as our invention and desire to secure by letters patent, is the vibratory motion given to the concave, substantially in the manner herein set forth.

SIDNEY A. BANTZ.
WILLIAM ANDREW.

No. 6917.—*Method of counter-balancing Window Sash.*

What I claim as my invention and desire to secure by letters patent, is the arrangement herein described of the hinged lever, pinion and racks, with respect to a couple of window sashes, whereby the sashes can be connected and disconnected, adjusted and counter-balanced, as herein set forth; but I make no claim to the mere counter-balancing of the sashes by this device.

WILLIAM T. BARNES.

No. 6918.—*Double Revolving Scraper.*

What we claim as our invention, and desire to secure by letters patent, is the double cavity or cyma reversa scoop and scraper, whether of the precise shape herein described, or of any other substantially the same revolving on *pivots, so* as to discharge and reload itself without being stopped and righted,

(irrespective of the particular form of frame in which it is placed,) in combination with devices, substantially as described for fastening and setting free the same.

ASHLEY CRAFTS.
EBENEZER WEEKS.

No. 6919.—*Improvement in Stone Dressing Machines.*

I wish it distinctly understood that I lay no claim to the invention of one or more chisels, and one or more hammers, as arranged constructed, and applied to cutting or reducing stone, previous to the date of my invention or improvements; but that which I do claim is as follows, viz:—

I claim the rotary hammer as constructed and combined with each chisel stock, and made to impinge against it, and permit it to immediately afterwards move forwards preparatory to another blow, essentially as specified.

WILLIAM EAYRS.

No. 6920.—*Improvement in Grain Separators.*

What I claim and desire to secure by letters patent, is the combination of the raking apparatus with the notched surface, Fig. 3, under which the irons on the ends of the rakes pass, by which means the rakes are caused to shake, which motion of the rakes shakes the straw, and thereby separates the grain from it.

SAMUEL W. FOSTER.

No. 6921.—*Improved Frog for Railroads.*

What I claim as my invention and desire to secure by letters patent, is a railroad frog, constructed with hinged leaves, acted upon either by weights or springs, essentially in the manner and for the purposes herein described.

JNO. HOFFMAN.

No. 6922.—*Improvements in File Cutting machines.*

Therefore, what I claim as administrator of George Crosby, deceased, and desire to secure by letters patent, is—

First. The peculiar combination of the spring with the hammer, in the manner and for the purpose above set forth.

Secondly. The application of a check bar *x x*, for the purpose described.

CAMILLUS KIDDER,
Administrator of George Crosby.

No. 6923.—*Improvement in Cooking Ranges.*

First. I claim the arrangement of the flues *m*, *n*, *o*, and N, on the sides, front, back, and bottom of the boiler J, formed by the sides, front, back, and bottom of the boiler J, and the upright plates L, provided with valves at the top, and brick work of the range, in the manner and for the purposes herein set forth.

Second. I also claim the arrangement of the flues *a*, *b'*, *b*, on the sides and back of the fire chamber, and the flues D, *j*, 5, under and at the back part and side of the oven and horizontal trunk E, with valves *(k,)* and communicating with the apartments to be heated for heating the air admitted from the cellar or other place by the valves *d*, and *z*, to the proper degree to be conveyed to the apartments, as described.

Third. *I likewise claim the* arrangement of the plates H, projecting from

the plate *l*, and openings in said plate *l*, for dividing the heat and causing one portion to be carried around the front part of the wash boiler G, and the other portion around the back part of the same, as described.

NICHOLAS MASON.

No. 6924.—*Improvement in making Artificial Teeth.*

Having thus fully described my improved tooth, and its mode of manufacture, what I claim therein as new and for which I desire to secure letters patent, is an artificial tooth having a plate combined therewith, substantially in the manner and for the purposes set forth.

GEORGE E. MURRAY.

No. 6925.—*Improved Concealed Trigger for Fire-arms.*

What we claim as of our own invention and desire to secure by letters patent, is the construction of a concealed trigger capable of being disclosed and made ready to operate by simple pressure imparted by the hand to its rear end, as described herein.

JACOB PECARE.
JOSIAH M. SMITH.

No. 6926.—*Improvement in Mills for Grinding.*

What I claim as my invention and desire to secure by letters patent, is a grinding mill consisting of two rolls, on whose surfaces grooved and fluted helical ribs are formed, and which move with different velocities, the several parts of the machine being arranged and operated substantially as herein set forth.

SAMUEL W. POWELL.

No. 6927.—*Improvement in Pumps for Raising Water.*

What I claim is the annular ring, with radial arm and slot in cylinder, immediately between the exit and entrance, and giving motion to the annular ring or piston by an eccentric or cam, and the whole operating conjointly together, as particularly set forth and illustrated in my specification and drawings herewith.

ALEXANDER STIVEN.

No. 6928.—*Improvements in Machinery for Spinning Hemp.*

The improvements produced by the use of circular heads, which I claim as my improvement, instead of the mere transverse arms and all other modes heretofore used, are the great steadiness given to the revolutions of the flyer, and the greater velocity imparted to it—the circular heads operating as a fly wheel or regulator.

The other improvement I claim as mine, is the mode of retarding the velocity of the spindle in an expeditious and easy mode, and to the nicest degree. To effect this, I attach to the spindle rail "*b*," in a substantial manner, the spring "*l*," which is composed of steel, bent so as to rise from the rail and to receive in a tongued end, without touching it, the shaft of the spindle. Then at a convenient distance between the base of the spring and the spindle, I cause a fine thread iron screw to be fastened in the frame, passing up through the spring and having a thumb nut on the end. The operation of this is, that when the thumb nut is screwed down the tongues of the spring rest on the washer or friction plate hereafter described, and thus bind the foot of the spin-

dle, around which is a rim or shoulder, as shown in the drawings, acting as a friction plate. Between the rim or shoulder and the spring, I use two washers on the spindle, the lower of leather and the upper of cast or wrought iron, turned and polished, and having in its upper surface two pins passing through corresponding holes in the tongues of the spring—an adjustable lever may sometimes be employed in place of the spring, to produce the dragging friction between the flanch or shoulder and the washer.

I do not claim as my invention the spinning frame, nor the spindle, nor bobbin, nor the use of a flyer, or the mode of operating same, but what I do claim as my invention or improvement, and desire to secure by letters patent, is the use of a circular headed flyer, having a circular head at each end, constructed and operating substantially as shown above.

I also claim in combination with a flanch or shoulder near the foot of the spindle, and permanently attached thereto the use of a moveable friction plate of metal, when the same is pressed to the flanch or shoulder or upon an interposed washer, by an adjustable spring or lever pressing on both sides of the spindle, and thereby producing a drag or retardation—while by its longitudinal action it retains the spindle steadily in its step, at the same time increasing the friction and retardation, whereby I am enabled to impart any required degree of tightness to the yarn as spun, and give it a greater uniformity of texture than can be done by any other known method as herein set fortn.

My improvements were intended for the purpose of spinning rope yarn, from all sorts of hemp and flax, but are equally useful for spinning yarn for sail cloth from hemp or flax—also yarn for bagging from hemp, flax or cotton—also for spinning worsted yarns—in short, for strong yarns from any material, and are also well calculated for making rovings—also for making cotton twine from cotton yarn—and also for doubling and twisting all sorts of yarn and twines. GARRET VAN RIPER.

No. 6929.—*Improvements in Condensers and Stuffing Boxes of Vapor Engines.*

I claim the ether generator or vaporizer and condenser, constructed substantially as described, whereby I obtain more perfect joints.

I also claim packing the stuffing boxes by means of leather or other analogous substance surrounding the body to be packed, when the said leather or other substance is surrounded by a chamber containing a fluid under pressure substantially as described.

PROSP. VERDAT DU TREMBLEY.

No. 6930.—*Improvement in Cast Iron Car Wheels.*

Having described and represented my railroad car wheel, by the foregoing drawings and specifications, what I claim as my invention and desire to secure by letters patent, is the particular manner of forming my wheel, it being formed of an inside and outside plate; each plate being formed of sunk and raised panels alternately, the space between the raised panels extending from the hub to the tread. The part of the plates which form the sunk panels join between the hub and the tread, for the purposes substantially as herein described and represented. HIRAM H. WISER.

No. 6931.—*Improvement in Detachable Buckle Tongues.*

What I claim as new and desire to secure by letters patent, is the detachable buckle tongues, constructed and arranged in the manner and for the purpose herein represented. ALVAH WORSTER.

No. 6932.—*Improvement in apparatus for Dyeing.*

What I claim as my invention is the above specified mode or process of producing either stripes or fancy patterns on or in cloth or fabrics of various kinds, the same consisting in the employment of one or more dye vats, and a dyeing frame, so constructed as to prevent the dyeing liquid from penetrating those portions of the cloth which we may not desire to color, and at the same time allow the coloring liquid to freely come in contact with the remainder or those which it may be desirable to color; all substantially as specified. And as auxiliary thereto I claim the employment of the vertical frames A, B, in connection with the main dye frame in manner and for the purpose of protecting from contact with dyeing liquid those parts of the cloth which may be strained directly over, against or on the ends of the horizontal strips of the main dye frame, as set forth.

EDWARD BRIERLEY.

No. 6933.—*Improvement in Brick Presses.*

What we claim as our invention and desire to secure by letters patent, is the combination of the horizontal mould wheel B, with the mechanical discharger *k*, and endless conveyor *p*, in the manner and for the purpose herein set forth.

JOHN T. BROWN.
MOSES FULLER.

No. 6934.—*Improvement in apparatus for Bending Hames.*

What I claim as my invention, and desire to secure by letters patent, is the process of bending hames by means of the combination of the hook piece D, and the iron strap C, made fast at the ends in the manner and for the purpose herein fully set forth.

ABEL GARDNER.

No. 6935.—*Improvement in machinery for turning Clothes Pins.*

What I claim as my invention is the rotary mandrel, the cutter for reducing the stick to a cylindrical shape, the cutter for forming the body of the pin, the cutter or cutters, for forming the head, the centre rod D, its fork and pattern lever; the whole being applied to carriages, and made to operate together, substantially in manner and for the purpose as above specified.

ASA GREENWOOD.

No. 6936.—*Double Bolt Trick Lock.*

What I claim as my invention and desire to secure by letters patent, is the combination and arrangement of the twin bolts E B, E′ B′, (any number being arranged in the same case) tumblers C, C′, having pins (*e*, *e*′,) at their ends, which enter corresponding notches in the bolts, traversing slotted plates D, D′, pins on the bolts E, E′, entering the slots of said plates D, D′, substantially as herein set forth; the bolts B, B′, nearest the key hole being required to be thrown out, and in before the other bolts E, E′, can be thrown out, and vice versa, as described.

LEWIS M. HARTLEY.

No. 6937.—*Improvement in packing Pump Pistons.*

What I claim as my invention and desire to secure by letters patent, is the pump piston constructed essentially of two disks, and a valve substantially as herein set forth, whereby it is rendered capable of keeping itself packed with water.

EDWIN A. JEFFERY.

No. 6938.—*Improvement in the mode of changing the gearing of Drawing Heads while in motion.*

What I claim as my invention, and desire to secure by letters patent, is a sliding spring key, arranged and operated substantially as herein set forth, for connecting any one of a series of wheels with a common spindle, and for disconnecting it therefrom at will.

ALFRED JENKS.

No. 6939.—*Improvement in Looms for weaving Figured Fabrics.*

Having thus described my improved loom, I shall state my claim as follows:—

What I claim as my invention and desire to have secured to me by letters patent, is the improvement herein above described in the machinery for operating the harness, so that any proper number of heddles may be used or changed as desired, without taking the loom to pieces; said improvement consisting first, in providing the moveable spring rests for supporting the jacks of the harness, when they are not in use, and which are sprung back by the bevel face on the shoulders of the jacks when they are kept in play by the cams on the pattern chain, the whole arrangement being substantially as herein above set forth; and second, in the "evener," constructed and operating as herein described for assisting in moving the upper heddle levers, and keeping them even, so that the cams or rollers on the pattern chain will operate accurately on the jacks as specified; meaning to claim the exclusive use of said spring rests and "evener," in a loom, the invention of which is entirely original with me.

I also claim the combination of rotating, lifting and depressing bars, arranged in endless chains, so as to revolve, as described, with the forked jacks, having internal shoulders, as specified.

MOSES MARSHALL.

No. 6940.—*Improvement in Bedstead Fastenings.*

What I claim as my improvement in the fastening, is the use of several projections *c*, as set forth, combined with the recesses *b*, cut into the sides of the mortise C, substantially in the manner and for the purposes herein set forth.

JOHN MOULTON.

No. 6941.—*Improvements in Machinery for preparing Hubs for Boxes.*

Having thus fully described my invention, what I claim and desire to secure by letters patent, is—

First. I claim the hinged jaws B, B, B, constructed and arranged in the manner described and operated as set forth, for centreing the mandrel A, to bore wagon or carriage hubs.

Second. I claim the hinged segmental nut *p*, constructed as described, in combination with the mandrel A, which has a square and inclined thread *o*, cut upon it, as represented in figure 11, to coincide with a thread of the same form cut on the inside of the said nut, to prevent the mandrel from feeding down too fast in the act of boring, and also to allow the mandrel to be moved up or down at pleasure, in the manner substantially as he described.

Third. I claim the mode of fastening the cutter *u*, to the mandrel passing it through the *slot or* eye *t*, of the nut or cutter box C, forme

an interior thread to fit on to the screw pin S, of the mandrel, whereby by screwing on the nut C, the end of the mandrel is made to retain the cutter *u*, firmly in its proper position for boring; in connection with this arrangement for setting and securing the cutting tool, I claim the cutter box, formed with the projection *v*, whereby by raising it (the box) until it comes in contact with the shoulders formed by the braces *h*, the cutter can be screwed and unscrewed without a wrench, as herein fully set forth.

ISAAC MUNDEN.

No. 6942.—*Improvement in Machinery for making Cord.*

What I claim in the foregoing as my invention and desire to secure by letters patent, is—

First. Revolving the bobbin frames on their own axes, to twist the strands, at the same time that they are carried round a common centre to twist the cord, by rolling them on the surface of a stationary annular inclined track, towards the inner or outer periphery of which they can be adjusted to run, so as to vary the relative twist of the strands and cord, substantially as herein set forth; but I make no claim to the mere turning of the bobbin frames by friction, by any of the devices usually employed for similar purposes.

Second. I claim the construction and arrangement of the central stem or spindle of the bobbin frame, operating substantially as herein set forth, whereby the yarns are collectively subjected to progressively increasing tension and twist, from the commencement to the end of the process of laying them into the strand, whereby the latter is rendered smooth and regular in its figure, and of uniform density and strength, and subjected to uniform tension while being lain into the cord.

WILLIAM E. NICHOLS.

No. 6943.—*Improvement in making Tin Boilers for Cooking Stoves with Cast Iron Bottoms.*

What I claim, is my improvement in the manufacture of boilers for cooking stoves, as above set forth, that is, making the bottoms of cast iron and the bodies of tin, the two being soldered together, substantially as described.

GIBSON NORTH.

No. 6944.—*Improvement in Bedstead Fastenings.*

Having thus fully described my improvements in bedstead fastening, what I claim therein as new and for which I desire to secure letters patent, is a bedstead fastening, consisting of a box formed of two parts, having screw threads therein, and divided through the centre longitudinally in the plane of the axis of said screws, as described and represented, said parts being so formed by locks as when inserted into a bed-post to have both parts firmly held in place against the force of the screw.

J. PARSONS OWEN.

No. 6945.—*Improvement in Faucet Breech Guns.*

What I claim as my invention and desire to secure by letters patent, is, *in* combination with a vibrating breech, turning within a chamber, the making of a groove or grooves in the inner periphery of the chamber, and

extending out at the side or sides thereof, for the purpose and in the manner substantially as herein described. I also claim the revolving charge holder, located in the breech of the stock, substantially in the manner and for the purpose specified. And, finally, I claim the combination of the levers (*s* and *w*,) by means of which one charge only is permitted to fall forward at a time, when the muzzle of the gun is depressed, and by which it is forced home into the vibrating breech, as described. A. D. PERRY.

No. 6946.—*Improved Apparatus for drawing Water from Wells.*

What I claim as my invention and desire to secure by letters patent, is the mounting of the respective parts of the drawing apparatus upon the rotating disk A, when the said disk is placed upon and supported by the circular platform B, which has the grooves *o*, *p*, formed in its face, and the notched ears *r*, *t*, rising from its periphery, that are combined and operate with the drawing apparatus, substantially in the manner and for the purpose as herein represented and described.

HARVEY W. SABIN.

No. 6947.—*Improvements in Self-acting Car Couplings.*

I lay no claim to the combination of a tumbler cylinder or roller, a catch hook, a coupling bar and box, as combined, constructed, and alleged to have been invented by A. G. Heckrotte, of Washington, D. C., the same being described in a paper termed the "Scientific American," published at New York or Washington on the twenty-ninth day of January, eighteen hundred and forty-eight; nor do I claim the combination of a hook box and coupling link, as described in the application for a patent, which Daniel R. Pratt, of Worcester, has lately made to the commissioner of patents at Washington, and as lately patented by him in England; but what I do claim as my invention, is the revolving series of arms E F G H, and the link C, constructed with an opening O, or cross bar N, at one end or each of its ends, in combination with the box A, and pawl L, all substantially as above specified.

ALBERT G. SAFFORD.

No. 6948.—*Improvement in Machinery for Jointing Staves.*

Having thus explained my invention, I claim the plane stock of the jointer formed with a depression in the middle, for the purpose of guiding the shaving plane E, to shave the exact taper on the stave, from the bilge on the middle to the end of the stave, in the manner herein described, in combination with the mode of producing a traverse taper or feather of any angle on the edge of the stave, according to the diameter of the cask or barrels, by the stave being held to the action of the shaving knife E, by the combination of the plane stock C, and the clamp with the guide rail F F, in the manner herein represented and described. DAVID VAUGHAN.

No. 6949.—*Improved Machine for Grinding or Polishing Tools.*

What I claim as my invention is the following, to wit:—

First. That part of the above described machinery by which an axe or other implement to be polished receives a reciprocating motion, and by which that motion is regulated, in combination with that part of the machinery by which it is made to cant or rotate at the same time, sufficiently to present all parts of the surface to be polished, to the polishing wheel.

Second. The machinery above described for holding and giving motion to the axe or other implement, while being polished, in combination with the polishing wheel, moved and kept in motion in the manner described in the above specification. JOSEPH VAUGHAN, Jr.

No. 6950.—*Improvements in operating the Hammers of Spike Machines.*

What I claim as my invention and desire to secure by letters patent, is—

First. The combination of advancing and receding hammers, with their respective adjustable wipers and hinged brays, arranged and operating substantially as herein set forth.

Second. I claim the adjustable wipers (k,) which can be set to cause the hammers to form spike points more or less sharp.

Third. I claim drawing the pointing hammers of a spike or nail machine along the rod, substantially in the manner herein set forth, during the operation of forming the point. HARRY A. WILLS.

No. 6951.—*Improvement in Bending Wood.*

I do not claim as my invention the mechanical powers by which the operation of bending timber is effected, nor any particular form of machinery to carry my new method into operation; but the machine herein described is a form which I have adopted to carry out and combine my new method of bending timber; but what I do claim is my method of bending fibrous materials by means of the upsetting movements, or the upsetting and relaxing movements combined, as exemplified in the screw H, whether such movement or movements be produced by means of the screw, wedge, cam, lever, rack and pinions, or any other equivalent means.

THOS. BLANCHARD.

No. 6952.—*Improvement in Bran Dusters.*

What I do claim as my invention and desire to secure by letters patent, is—

Constructing the rotary scourer and separator with concentric roughened and reticulated prismatic rings, and hanging roughened or toothed prismatic rings, the latter being placed in the spaces between the former, so as to leave concentric spaces between their inclined surfaces for the passage of the bran and flour over and around the ridges and sides of the aforesaid several prismatic rings, in the manner and for the purpose herein fully set forth, by which the flour adhering to the bran, after leaving the ordinary bolts, is completely separated therefrom and saved, to be mixed with the superfine flour, or for any other purpose which the miller may desire, the flour passing through the wire bolting screens G and I, and out of the curb or case through the spout S, whilst the bran is forced to the upper part of the curb, and out of the spout R, by the centrifugal action of the separator, aided by the blast of wind created by the rapid rotary motion of the said scourer and separator, as herein fully set forth; I make no other claim. ROBT. M. DEMPSEY.

No. 6953.—*Improvement in the Manufacture of Buttons.*

Having thus described my invention, I claim the new and useful improvement in the manufacture of buttons, of substituting a wooden mould for the common metallic shell that is stuffed with paper, and using the said wooden mould either for the top or bottom of the button, and covering the button *entirely or only* part of it with some textile fabric or substance, and securing the

shank and the covering inside between the wooden mould and ring or collet of the button, in the manner herein represented and described.

PETER KIRKHAM.

No. 6954.—*Improvement in Clover Harvesters.*

What I claim in the foregoing as my invention and desire to secure by letters patent, is maintaining the series of teeth at nearly the same angle with the ground at all heights to which they may be adjusted therefrom, in the manner herein set forth and represented in fig. 1.

I also claim forming the fingers with a depression on their upper side above the knife, substantially in the manner and for the purpose herein set forth.

SAM'L KRAUSER.

No. 6955.—*Improved Alarm for Indicating want of Water in Boilers.*

Having thus explained my invention, I claim the introduction of the tube or box on the flue or other surface exposed to extra heat when water is too low, filled with water or other suitable liquid, for the purposes set forth.

AZEL S. LYMAN.

No. 6956.—*Combined Lap and Butt-welded Tube.*

Having thus fully described my improvements in wrought iron pipes, I wish it to be understood that I do not claim either a butt-welded or lap-welded joint therein, as they are both old devices; but what I do claim, is a pipe composed of a combination of the butt-weld with lap-welded ends, as bove particularly set forth.

JAMES McCARTY.

No. 6957.—*Improvements in Folding Gates.*

I do not claim any of the individual parts composing my gate, nor do I claim placing thin pieces of timber or other materials parallel to each other, inclining to a horizontal plane, and crossing these with other similar parallel pieces inclining in an opposite direction, and uniting them at their intersections by loose pins forming diamond and half diamond spaces between them, and opening and closing on the principle of the "*lazy tongs;*" but what I do claim as my invention and desire to secure by letters patent, is a single or double gate, constructed substantially as herein above described, so as to fold up horizontally in opening the same by degrees, according to the width of opening required, without the necessity of moving the whole structure, as when it swings on hinges horizontally in the arc of a circle, or vertically on a horizontal bolt or pin when folding in the manner of a parallel ruler, my said improved gate moving horizontally over rails on wheels, with great ease whilst being contracted or expanded in opening or closing the gate, as herein fully set forth.

ISAAC MERITT.

No. 6958.—*Improvement in the Manufacture of Flax and Hemp.*

Having thus described my invention, what I claim as new and useful, and for which I desire to secure letters patent, is the following process for preparing hemp and flax for spinning, viz: the treating of the lap after it comes from the "spreading frame," with an alkaline solution to soften the gluten of the flax, and washing it afterwards, as has been described, as a preparatory process for drawing it in the common drawing frame, and drawing the flax lap in the commom drawing frame, while the said flax lap is in a wet state, to

draw out, separate the finer from the coarser fibres, and reducing the flax to its greatest possible fineness, making less tow and running the machinery at a greater speed than by the dry process, and dispensing with the hetchell gill frame, substantially as herein set forth. ROBERT PATTERSON.

No. 6959.—*Improvement in Signal Lanterns.*

What I claim as my invention, and desire to secure by letters patent, is subdividing the front of the lantern into three divisions or sectors, and arranging and operating the colored glasses enclosed therein, in the manner herein described. HUGH SANGSTER.

No. 6960.—*Improved Method of Revolving the Hammer of Repeating Fire-arms.*

What I claim as my invention and desire to secure by letters patent, is the combination of the cocking and spring levers with the double ratchet wheel on the revolving hammer, substantially in the manner herein set forth.
CHRISTIAN SHARPS.

No. 6961.—*Improvement in Churn Dashers.*

I do not claim the tub, hollow shaft, hollow arm, or any part of the churn that has heretofore been used for making butter; but what I do claim as my invention and desire to secure by letters patent, is—

The combination of the perforated *spiral float* B, with the *prismatic horizontal radial arm* C, and vertical shaft A, arranged and operating in the manner and for the purpose herein set forth. HENRY STANTON.

No. 6962.—*Improved Valve-motion, Cut-off and Steam Stops for Rotary Engines.*

Having thus described the principle or characteristics of my inventions, which distinguish them from all other things before known and described, and represented the manner of constructing and using the same, and some of the modifications of which it is susceptible, what I claim as my invention and desire to secure by letters patent, is—

First. The method of operating the steam stops or abutments by a crank motion derived from the rotation of the piston wheel, substantially as described, when this is combined with the rotating piston wheel, the form of the periphery of which, is such as would be generated by its rotation and the motions of the steam stops, substantially as described, that the steam stops may always in their motions be in contact with the periphery of the piston wheel, and not operated by such periphery as described.

Secondly. I claim making the ends of the steam stops with projections or toes that embrace the sides of the piston wheel, and extend within the periphery thereof, substantially as described, when this is combined with the grooves or recesses in the packing ring, or any equivalent substitute therefor, substantially as described, whereby the steam is prevented from passing from one side to the other of the pistons through the grooves or recesses in which the ends of the stops slide, as described.

And thirdly, I also claim in combination with the herein described method of operating the steam stops, the employment of cut-off valves operated by eccentrics (or their equivalents) on the crank arbors that operate the steam stops, substantially as described. HENRY G. THOMPSON.

No. 6963.—*Improvement in Bottle Fasteners.*

What I claim as my invention and desire to secure by letters patent, is the combination of the metallic caps with the tube *b*, constructed and used in the manner and for the purpose set forth. ISAAC WINSLOW.

No. 6964.—*Improved Concealed Hammer and Turning Nipple Lock.*

I do not lay any special claim to the peculiarity of construction of the individual parts of this lock, as they may be varied in many ways, nor do I claim a concealed lock for exploding the cap inside the stock; but what I do particularly claim as my invention and desire to have secured to me by letters patent, is the combination of the lever K, with the nipple attached thereto, and sliding hammer M, arranged and operated substantially as set forth, by which the nipple is turned and exposed to receive the percussion cap, and the hammer cocked simultaneously by the movement of the lever, the cap being exploded within a chamber inside the stock in a peculiar manner, as set forth in the foregoing specification, by which the inconvenience arising from flying fragments of the exploded cap and from smoke at the moment of discharge are avoided. ANDREW WURFFLEIN.

No. 6965.—*Improvement in Machinery for Dressing Staves.*

What I claim as my invention and desire to secure by letters patent, is the tilting plate *d*, placed in front of the forward cutter *a*, in the head K, in combination with the pin *r*, projecting from the beam T, of the supporting frame, for the purpose of throwing the shavings clear of the cutters, substantially in the manner herein set forth. ASA BROAD.

No. 6966.—*Improved Lock for Fire-arms.*

What I claim as new and of my own invention and desire to secure by letters patent of the United States, is the mode described of forming the seer 3, as a lateral spring, with a bevel on the part next the tumbler, and the mode of forming the projection 6, on the tumbler 8, with a similar bevel, so that these two parts operate together to discharge the fire-arm, by the direct pull of the trigger, and place the parts in a situation to effect a second, or successive discharges by the reverse motion of the trigger, the whole of these movements and effects, being produced by the seer and tumbler, without any intervening parts, substantially in the manner described and shown.

ORISON BLUNT.

No. 6967.—*Improvement in Drawing Boards.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the pointed right angled plates C, bars (*a*,) moving over the pins (*b*,) forming the legs on which the board rests, spiral springs D, and rod or bale E, of the form of an ellipsis for clamping and unclamping the paper, as before described. HENRY W. CHAMBERLIN.

No. 6968.—*Improvement in Flutes.*

What I claim as my invention and improvement, and desire to secure by letters patent, is—

First. Removing the third and sixth holes from their ordinary place on the old flute to a point farther down, and sounding the notes produced by the said *holes, by keys operated at the* natural fingering place, thereby producing with

ease a quality of tone, now unattainable, or attained only by great skill, and then with uncertainty.

Secondly. I claim producing the true sharp and flat keys by means of the double holes and operating keys, as described herein.

C. G. CHRISTMAN.

No. 6969.—*Improved Process for Making Thin Iron Castings.*

What we claim as our invention, and desire to secure by letters patent, is the process of making thin or light castings of iron, by pouring the metal into a mould of iron that surrounds the article to be cast, entirely, with the exception of the gates; said mould being previously smoked on the inside and provided with a case or knapsack which contains a non-conducting material, the whole process being conducted substantially in the manner and for the purposes herein set forth.

HENRY BLEECKER.
WILLIAM E. BLEECKER.
SAMUEL D. VOSE.

No. 6970.—*Improved Earth Borer and Elevator.*

Having thus fully described the nature and operation of my machine for boring the earth and raising to the surface in a cylinder by one operation, whatever is displaced by the process of boring; what I claim as new therein, and desire to secure by letters patent, is the combination of the auger and the circular plate I, fixed upon the same shaft with the cylinder C, which does not revolve with the shaft, and may be moved along it, by which I dispense with the force necessary to turn the cylinder and empty out the excavated material, in an easier manner than has heretofore been practised.

PHINEHAS DOW.

No. 6971.—*Improvement in Cast Iron Car Wheels.*

Having thus fully described my improvement in forming and constructing a solid cast iron wheel, I do not claim as new or as my invention, corrugated plates or flanges, or corrugated spokes; but what I do claim as my invention and discovery is the form of the car wheel, made with the multiplied and reversed or alternate corrugations of the plate or flanges, as above specified and described, and also the combination of the said plates or flanges with the said spokes, so corrugated or bent, as above set forth and described, so as altogether to prevent straining or cracking of the metal by contraction in cooling, and giving thereby and by the said combination, greater strength and durability to the cast iron car wheel, than has before been obtained.

CARMI HART.

No. 6972.—*Improvement in Bedsteads.*

Having thus fully described and represented my improved bedstead, I do not intend to limit myself to the fastening the frame thereof by rods, as described and represented, as this may be effected by right and left screw threads being cut on the tenons of the side rails and other known devices; but what I do claim as my invention and desire to secure by letters patent, is the union of the side and end rails of a bedstead into a frame entirely independent of the posts, substantially in the manner and for the purpose as herein set forth.

BENJAMIN HINKLEY.

No. 6973.—*Improvements in Breech Loading Fire Arms.*

What I claim as my invention, and desire to secure by letters patent, is in combination with a magazine for containing the cartridges or loaded balls, and which communicates with the barrel, the employment of a sliding charger, operated substantially as herein described, for the purpose of forcing the cartridges as they are required, towards the rear end of the magazine as described.

Second. I claim making the charger in two parts connected by a spring, and working substantially as herein described, whereby any difficulty arising from irregular working or yielding of the parts will be avoided, and by which also the transfer of the cartridges or charges to the carrier is insured.

Third. I claim combining the carrier, the breech pin, and the abutting or stop lever with the sliding trigger bar, substantially as herein described, whereby all the movements of all these parts are effected by the motions of the trigger bar, as described.

Fourth. I claim the longitudinal fillet on the trigger bar in combination with the pinion, having one cog grooved for the passage of the said fillet, substantially as described, by means of which the pinion is made to retain the sliding breech pin in place, while the trigger bar completes its motion to discharge the piece and to elevate the stop or abutting lever, as described.

Fifth. I claim the stop which prevents the passage of the cartridges from the magazine, when this is combined with the carrier and magazine, substantially as described.

Sixth. I claim in combination with the receiving chamber and carrier, the lever which hugs and steadies the cartridge or ball therein, substantially as described.

Seventh. I claim in combination with the carrier that elevates and transfers the cartridges or charges, the spring catch, by means of which the carrier can be held down to permit the piece to be re-cocked without transferring a charge to the barrel, substantially as described.

And finally, I claim the spur on the spindle of the cock in combination with the catch on the sliding breech pin, substantially as described, by means of which the pull on the cock has the effect to withdraw the breech pin from the breech of the barrel, as described.

L. JENNINGS.

No. 6974.—*Tubular packing for Pistons and Stuffing Boxes.*

And having now described the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim as of my invention is the employment of yielding hollow rings, and yielding tubing (of whatever material the same may be composed) filled with air or gas, more or less compressed, for the better packing of the pistons and stuffing boxes of engines worked by steam, air, or gas, as before exemplified and described.

WILLIAM CROFTON MOAT.

No. 6975.—*Improvement in Railroad Trucks.*

Having thus fully described my improvement, what I claim therein as new and for which I desire to secure letters patent, is the combination of the friction wheels and truck wheels, with the truck frame, substantially as herein described, in which I employ sliding boxes, and connect the parts with springs, while at the same time the axles are made to work steadily in union, and produce the desired effect in a perfect manner.

J. W. MOYER.

No. 6976.—*Improvement in Seed Planters.*

I do not claim to be the first inventor of an intermediate cog wheel, hanging rod, connecting rod, crank, rock shaft, lifting rods, or any of the mechanical devices separately considered, as these are all common articles of mechanism; but what I do claim as my invention and desire to secure by letters patent, is the peculiar construction of the short axles Y, as described, in combination with the drilling and seeding machine, said machine containing an intermediate cog wheel for gearing and ungearing the seed roller with the cart or driving wheels; said machine also containing a device for simultaneously elevating and dropping all the tubular drills, and likewise containing separate lifting and suspending hook rods, for raising or suspending one or all of the tubular drills at the same time. JACOB PEIRSON.

No. 6977.—*Improvements in Wheels for Carriages.*

I do not claim to be the original and first inventor of an iron rimmed wheel, composed of cast iron segments or felloes bound together by a wrought iron band, having wood spokes and hub, nor any part of the wheel heretofore used in a similar manner to that herein described in the construction of carriage wheels; but what I do claim as my invention and desire to have secured to me by letters patent, is the manner of employing the screw bolts between the ends of the cast iron felloes of the peculiar construction herein set forth, in combination with said felloes, and the ordinary circular wrought iron tire in the formation of carriage wheels for common roads. ISAAC B. WARD.

No. 6978.—*Improvement in Portable Lanterns.*

What I claim as my invention, is the lantern constructed with a closed flame chamber, (having glass or transparent sides,) in combination with an open air supplying and chimney tube G, (extending down through the top of the lantern,) and the cap plate or disc, the whole either with or without upper frustum H, and as applied together and made to operate substantially as above specified.

I make no claim to the use of a reflector in a lantern, as it is ordinarily used, but what I do claim is the combination of the reflector, the lamp, the closed flame chamber, and the chimney over the flame, (the same being as above specified and as represented in the drawings,) in order that the external downward or supplying current of air shall so encircle the upward current of smoke and hot air proceeding from the flame, as to prevent it in a great measure from smoking or soiling the reflector, and thereby cause it to improperly distribute the light which eminates from the flame.

NATHANIEL WATERMAN.

No. 6979.—*Improvements in Machinery for Boring Window Blinds.*

What I claim as my invention and desire to secure by letters patent, is the combination of the graduating frame J, spring stops or pawls (n,) bent levers (m,) attached to the rib p, by chains or cords with the sliding frame H, to which the frame or slat to be bored or mortised is secured as described.

I also claim the combination of the traversing arms y, projecting from the slides moving in the plates O, and provided with clamp screws for securing the ends of the frames, with the hollow traversing boxes K, M, provided with clamp screws, and springs and spring rollers u, for steadying the frame in its passage, as herein set forth.

I likewise claim the combination of the elliptical cams (*b*, *e*,) secured to the upright shafts E, (*d*,) having cog wheels on their upper ends, with the pul leys (*a*,) in the manner and for the purpose herein set forth.

JOHN WILEY.

No. 6980.—*Improvement in Apparatus and Process of Rotting Hemp and other Fibrous Materials.*

In conclusion, I do not confine myself to the particular apparatus, nor the form or arrangement thereof, as herein described; but that which I do claim as my invention and desire to secure by letters patent, is the treating of hemp, flax, China grass, and other vegetable fibrous substances, in preparing them for spinning into fine yarns by steam, alkaline and saponaceous solutions, and drying the same by steam, as herein before described, without handling the same during the process, thereby saving much labor and expense, as well as avoiding loss of material from tangling, matting, &c.

Secondly. I claim the combination of the vessels A′, B, and A, with their connecting pipes arranged so as to operate upon the hemp, &c., with the steam and solution, in the manner described herein, or such other arrangements as shall include substantially the same process.

LEMUEL W. WRIGHT.

No. 5992.—*Improvement in Grain Drills.*

What I claim as my invention and desire to secure by letters patent, is the combination of the fixed and sliding apertures *a* and *c*, with the stops *b*, as herein described, to form passages which are constantly open, and through which the seed may be discharged from the hopper into the drills made by the teeth, without being clipped, bruised, or otherwise injured by the operation.

ALBERT G. BARTLETT.

PATENTS EXTENDED DURING THE YEAR 1849.

Casting Chilled Rollers and other Metallic Cylinders and Cones.

What I claim as my own invention, and not before or previously known in the above described machine or improvement, is that the tube or tubes or passages called gates, through which the metal is to be conveyed into the mould, shall not enter the mould perpendicularly at the bottom, but slanting, or in a direction approaching to a tangent of the cylinder, or if the gates enter the mould horizontally, or nearly so, that they shall not enter in the direction of the axis of the cylinder, but in a tangent form, or inclining towards a tangent of the cylinder.

JAMES HARLEY.

Improvements in Fire Arms.

What I claim as my invention, and desire to secure by letters patent, is:

First. Combining a rotating chambered breech with the lock, in manner substantially as herein described, so that, by the operation of lifting the hammer to cock the lock, the said breech shall be rotated to the extent required to bring a loaded chamber in the line of a barrel preparatory to the discharge, substantially as described.

Second. Combining the rotating breech with the lock by means of a key

catch, lever, or the equivalent thereof, substantially as specified, so that, by the act of lifting the hammer to cock the piece, the said breech shall be liberated to admit of its being rotated and then relocked, that it may be held in the proper position during the discharge, substantially as described.

Third. Placing the nipples of the rotating breech in recesses made in the rotating breech, or between partitions, substantially as described, as a protection to the caps, or touch-holes, from the effects of lateral fire, as described.

Fourth. Connecting the barrel with the recoil shield at the back of the rotating chambered breech by means of an arber, or spindle, (on which the breech rotates,) and a wedge-key, substantially as described. And

Fifth. Connecting the barrel with the recoil shield by means of the lock plate below the rotating breech, substantially as described, in combination with arber or spindle connection, as described, whereby the parts are held together firmly, whilst at the same time they admit of a quick and easy disconnection.

SAMUEL COLT.

Improvements in the Screw Wrench.

What I claim as my invention and desire to secure by letters patent, is the arrangement of the screw upon the two circular edges of the main bar, in the manner and for the purpose herein described; also, the combining the nut and slide jaw in the manner and for the purpose herein described.

SOLYMAN MERRICK.

Machine for bending or setting Felloes for the wheels of Carriages or Wagons.

What I claim as my invention and for what I ask a patent, is the machine or apparatus as herein described, and may properly be denominated revolving cylinders, to be used for the bending of felloes for carriages and wagons of all descriptions, sleigh runners, iron tires for wheels, coopers' sett hoops, vessels' mast hoops, &c.; in which machine two cylinders are employed, operating together by means of certain accessary parts, in the manner or upon the principles herein set forth; not intended, however, to limit myself in the formation of the accessary parts, or to the specific use herein stated, but to vary these in any way and to apply them to any use not varying from the principle, as I may find convenient, whilst the machine continues substantially the same, and a similar effect is produced by analogous means.

EDWARD REYNOLDS.

Improvement in the construction of Stoves for the burning of Anthracite Coal and other Fuel.

What I claim as my invention, and desire to secure by letters patent, is the forming of the exterior or shell of furnaces or fire places, for stoves of various kinds, the bodies of gas retorts and other apparatus, which are to be exposed to great alterations of temperature, by the combination of separate rings, rims, or frames of metal, usually of cast iron, by which means any difference of expansion in the respective parts may take place without the danger of breaking, whilst any portion which is defective may be easily removed and its place supplied.

JORDAN L. MOTT.

Improvement in the Art of and Apparatus for the Transportation of Goods on Canals and Railroads.

JOHN ELGAR. [See Re-issue, No. 154.]

Improvement in Machine for making Horse Shoes.

I shall now proceed to claim what I consider new and invented by me; and—First. I claim the machine for rolling, drawing, or shaping horse shoes, as described and represented by the two sheets of drawings, Nos. 1 and 2, *as a whole as there arranged;* namely, those parts called side steels or irons *l, l,* which confine the piece of iron intended for a horse shoe on the sides, while it is rolled or shaped by the vertical swedges E, E. I also claim the vibrating or reciprocating motion of moving frame *f, f,* which gives motion to all the other parts of the machine, which enables the operator to feed up the iron intended for horse shoes to the stop A, cutting it off accurately, and rolling or shaping them at the same time.

And I wish it expressly understood, that I claim the above named reciprocating motion, whether it be by side steels and swedges, as above named, or whether it be merely a pair of common grooved rollers, the one having a groove or channel turned or cut the shape of the shoe, the other having a tongue so shaped as to fit the groove exactly, the periphery of said tongue being so shaped as to roll the shoe thinner at some part than others, as may be desired. It will be observed, that if two rollers, as above named, were connected together at the end by two pinions, and on the other end of one were fastened a wheel, similar to the wheel M, on one of the shafts *g*, of the bending machine, as seen at sheet No. 3, figure 1, having a rack operating into said wheel, connected to a crank, in every respect similar to the bending machine, it is evident that said rollers would move backward and forward, making such part of a revolution as the length of the crank might give them. I therefore claim said reciprocating motion, when applied to rolling or shaping horse shoes by rollers. I do not claim the use of *solid rollers*, in rolling horse shoes, for I believe this has been done, or rather *attempted to be done*, which has universally proved a failure, in consequence of not having reciprocating motion to enable the operator to feed up the iron to a stop, so as to ensure the piece of iron intended for a horse shoe being always in the proper place, to . . . . . the impression from the rollers.

Another reason why rolling horse shoes by solid rollers has failed, is that the tongue of the one and socket of the other are liable to wear, consequently have to be laid aside, whereas my method of having the tongue or swedges, as also the socket divided into sections which allows the whole being ground, repaired and moved at pleasure, by screws so as to ensure the sides of the socket fitting close to the tongue, as also having one side of the socket moveable, to allow the shoes being discharged. I also claim the method of having those parts of the machine which confine the iron on the sides, represented as side steels, marked *l l*, moveable, so as to permit their being ground (when worn) at the same time moving them close up to the swedges E E, by screws. I also claim the plan of making the rollers *i i*, sheet No. 1, Fig. 2, with an open mortise, so as to prevent the swedges D D, being moved: in fine, I claim the method of dividing the working parts, which roll or shape the shoe into such section as enables me to grind, replace or move them at pleasure, in lieu of solid rollers which when worn have to be laid aside altogether. I wish it particularly understood that I do not confine myself to the precise method of operating the machine for rolling or shaping horse shoes, as represented by the drawings hereunto annexed, as in lieu of the frame *f f*, being moved it may be made stationary, and the rollers *i i*, moved backwards and forwards in slides, with corresponding movements given to the other parts, which would produce analogous results.

Secondly. I claim the machine for grooving and punching horse shoes, as represented by the drawings and description thereof. That is to say, I claim the manner for confining the piece of iron intended for a horse shoe, between the side steels *l l*, while in the act of grooving and punching by the upper swedge D, having the pieces of steel fastened under the caps *i i*. I also claim the vibrating or reciprocating motion of the machine in grooving and punching, for the same reasons as set forth in my claim to the machine for rolling or shaping.

I wish it understood, I do not claim the rolling a plain groove or channel along the one edge or side of a bar of iron intended for horse shoes, for I believe this has been done, but I do claim the manner of so shaping the edge of the steels as to leave projection for the head of the nails, as in all cases, even when made by hand, the groove is first made, then the holes, but in my plan I make both at once, which serves the double purpose of adding strength to the punches, by being formed on and composing part of the steel which forms the groove or channel, as also performing both operations at once. I also claim, the method of fastening the two pieces of steel which grooves and punches the shoe under the caps *i i*, which permits their being screwed down by the four screws, when necessary in consequence of their becoming short by filing or other causes. And as I deem the discovery of forming the projections or punches on the same piece of steel, which grooves or channels the shoes of great importance, I shall describe the manner in which it is done. I take a piece of cast or other steel, previously rolled or hammered to at about one fourth of an inch in thickness, about four inches wide, and as long as necessary to form the groove on one side of the shoe. I then grind or reduce the edge by a file to the proper shape to form the groove, then mark off where I want the projections or punches, filing down the spaces between the projection so as to give them sufficient length to form the holes, which adds great strength to the punches compared with the method of inserting small pieces of steel into a roller to form punches, as has been proposed, although I believe never carried into effect, from its impracticability.

Thirdly. I claim the machine for bending horse shoes, as represented and described by the drawings thereof, in every *particular as there arranged*. And in addition to which, I claim any other method of bending horse shoes, so long as the piece is taken hold of by one end, while the other is bent round the mould; no matter whether the mould revolve round or is stationary, and the piece of iron is pulled or bent round it.

I also claim in a particular manner the placing the face of the mould downwards so as to permit the shoe to drop or discharge itself; I wish it also expressly understood, that I claim the using a piece of flat iron, as represented by the dotted lines (see sheet No. 3, Fig. 3,) for the purpose of keeping the shoe close up to the mould, while in the act of bending. I also claim, the *nipper* or *button* N, (see sheet No. 3, Fig. 3,) which closes and holds fast the end of the horse shoe by striking against the piece L, while in the act of bending round the shoe shape K, and which opens in consequence of its coming in contact with the other side of the piece L, and lets the shoe drop.

I also claim, the manner of making the gearing or wheels connected with the pieces of iron K & L, eccentric or so shaped as to have the pitched line describe the same circle as the shoe, otherwise *the shoe* would not bend regular.

It will be observed that although the gearing is by no means round, nevertheless it operates accurately while they revolve round on their respective shafts.

HENRY BURDEN.

PATENTS RE-ISSUED DURING THE YEAR 1849.

No. 128.— *Improvement in Bee Hives.*

aving thus fully described the nature, construction and operation of my ntion, what I claim as new and desire to secure by letters patent, is provi-
a harbor or place of refuge for the bee-moth or miller, which admits of ree ingress and egress thereto, to secrete herself, and lay her eggs undis-ed by the bees, the entrance to the trap not being of sufficient size to ad-he passage of the bee.
also claim as original, the combination of the moth trap or harbor (K,) re described, with the suspended hive (A,) constructed and arranged in nanner set forth.

A. SANBURN.

No. 129.— *Improvement in Propelling Ships.*

hat I claim as my invention, and desire to secure by letters patent, is bove described location or arrangement of the propeller shaft in combi-n with the rudder, made with a slot or recess to admit of the play thereof, tantially in the manner and for the purpose specified.
also claim sustaining the propeller abaft the rudder, by a swinging or sli-frame, substantially as described, in combination with the shaft made in parts, substantially in the manner and for the purpose specified.
nd finally, I claim in combination with the arrangement or location of the eller shaft, and the hanging of the propeller in a sliding or moving frame, narking of the shaft in two parts, substantially in the manner and for the ose specified.

J. ERICSSON.

130.— *Improvement in the Saw Mill for Re-sawing Boards and other Timber.*

hat I claim as my invention, and desire to secure by letters patent, is nethod of presenting, gauging or guiding the board by means of the rest pressure rollers, or their equivalents, substantially as herein described, in bination with the saw, substantially as described; and I also claim the od substantially as herein described, of hanging and straining the saw by combination of three stirrups at the ends of the saw, constructed and con-ed in manner substantially as herein described.

PEARSON CROSBY.

131.—*Machine for Sewing Cloth of all kinds with a running Stitch.*

hat I claim as my invention, is the combination of a straight or curved le, and two or more gear wheels for forming the doubles or corrugations e cloth, the whole being made to operate together essentially as above ified; and in combination therewith I claim one or more cogged wheels

D D F, applied substantially as above specified, and for the purpose of advancing the doubles of the cloth along the needles, as above explained.

I also claim the herein before described mode of preventing either retrogradation or any improper movement of the needle, viz: by making it with a crook or bend, and placing against said bend, one, two or more wheels D E F, as herein before described, and as represented in the drawings.

BENJAMIN W. BEAN.

No. 132.—*Improvements in Barrel Machinery.*

What I claim as my invention and desire to secure by letters patent, is—

First. The combination of the slide rest *k*, guided in the manner set forth, with the tool L, for turning off the cask, constructed and arranged in the manner set forth.

Second. I also claim the apparatus for chamfering and howelling and crozing, that is to say, the combination of the cylinder E, open at both ends, so that both ends of the cask can be worked off without changing, with the ring chucks O, for fastening the cask into the cylinder, and with the tools, as herein described, for chamfering and howelling.

Third. I also claim the crozing tool V, with the changeable face plate *w*, as herein set forth.

Fourth. I likewise claim the combination of the stock *l*, cutter l^1, adjustable and gauge plate l^2, constituting the tool for turning and smoothing the outside of the cask, as above described and represented in figure 4.

Fifth. I likewise claim the peculiar construction of the tool for howelling the cask, as above described and represented at fig. 9.

Sixth. I likewise claim the peculiar construction of the tool for chamfering the ends of the cask, as above described and represented in figure 8.

Seventh. I likewise claim the mode of edging and jointing *bilge* staves for making barrels and other *bilge work*, by the employment of a swing frame, having a *concave or convex* bed in or against which the stave is sprung and secured to the required bilge, in combination with the revolving edging saw and reciprocating straight jointer, or either, whether the said swing frame for confining the stave in its bent position, and conveying it to the edging saw and straight jointer, be constructed, arranged and operated in the manner herein set forth, or in any other mode or manner that may be substantially the same, and by which analogous results shall be produced.

WM. TRAPP, Jr.

No. 133.—*Improvement in Preparing Wool and Cotton for Carding.*

What I claim as my invention and desire to secure by letters patent, is the application of heat and moisture to wool, by means of steam, for the purpose of rendering its fibres sufficiently soft, flexible and pliable to pass through the operations of carding and spinning, without requiring the use of oil upon the same.

I also claim the application of steam to cotton, or other soft fibred substance for the purpose of giving additional softness and flexibility to their fibres during the operations of carding and spinning.

GEO. L. MASON.

No. 134.—*Improvement in Machinery for making Felt Fabrics, &c.*

What I claim as my invention and desire to secure by letters patent, is first, the combination of the fan, oblong box, or spout and cylinder, for the purpose and in the manner herein described; and second, the combination of the two aprons, operating for the purposes and in the manner herein described, and also these in combination with the combined fan, spout and cylinder, as herein described.

HEZEKIAH S. MILLER.

No. 135.—*Improvement in Floating Dry Docks.*

What I claim as my invention and desire to secure by letters patent, is: —

First. The end floats T, T, by means of which the dock may be balanced and leveled, and which may be forced down by machinery, substantially as herein described.

Second. I claim regulating the line of motion of said floats, and of applying the control exerted by them to the dock, by means of guides and frames in which they are made to move, the whole operating and constituted substantially as herein described.

JOHN THOMAS.

No. 136.—*Improvement in Hot Air Registers.*

Having thus briefly described the construction and operation of my register, I will briefly state what I believe to be new about it, and what are some of the improvements made.

I do not claim the wheel itself as new, or a thing by any means patentable; but what I do claim and desire to secure by letters patent, is the application of the upright or vertical wheel, or part or segment of a wheel, to the opening and closing of hot-air registers and ventilators, the edge or periphery of which is placed flush, or nearly so, with the top surface of the register, and can be acted upon by the foot if desired. The wheel, or part of a wheel so placed, imparting motion to the valves through a connecting rod or rods, which are connected or attached to the wheel at a point distant from its axis, and to the valves, by pins at a distance from their centres of motion; the connecting rod or rods moving in a circular direction with and corresponding to the motion of the valves that are moved.

CHARLES F. TUTTLE.

No. 137.—*Improvement in Atmospheric Churn Dashers.*

What I claim as my invention and desire to secure by letters patent, is the employment of open mouthed buckets or beaters, having (a cavity or) cavities formed in their front or beating surfaces, in a vessel partially filled with milk or cream, for the purpose of enabling the buckets or beaters as they are operated to pass through air and cream, (or milk,) and thereby to force quantities of air into the cream (or milk) and to lift portions of the cream (or milk) into the atmosphere in the upper portion of the churn, by means of the said cavities in the beaters, for the purpose herein set forth.

NATHAN CHAPIN.

No. 138.—*Improvement in Cooking Stoves.*

We do not wish to limit ourselves in the construction of stoves to the use together of the two improvements herein above specified, as either may be used separately, as for instance, the advantages derived from the depressed flues may be obtained without the manner of connecting the two fire places, and in like manner all the advantages of the manner herein above described, of combining and connecting the two fire places, may be obtained without the depressed flues; but when both improvements are employed in connection, the best results will be obtained. Nor do we wish to limit ourselves to the employment of our depressed flues for carrying the draught around the oven, in the manner described, as the depressions in the bottom flue may be used in connection with other arrangements of flues, whether for carrying the draught in the direction described, or in any other.

What we claim therefore as our invention, and desire to secure by letters patent, is making the depressions in the bottom flue below the oven, substantially as described, for the purpose of equalizing the heat in the oven, as described.

And we also claim as our invention the combination of the two fire places by means of a flue pipe connecting the one with the ash pit of the other, and passing through the diving flue to divide the draught, substantially as described, and thus insure the passage of the heated products of the combustion from either or both around the oven when desired, as described.

ELIAS JOHNSON.
DAVID B. COX.

No. 139. — *Improvement in Screw Wrenches.*

What I claim as my invention and desire to secure by letters patent, is moving the sliding jaw by a screw, combined with and placed by the side of and parallel with the bar of the permanent jaw and handle, substantially as described, when the required rotation for sliding the jaw is given by the head or roset, (or its equivalent,) which retains the same position relatively to the handle during the operation, substantially as described.

And I also claim moving the sliding jaw by a screw, combined with and placed by the side of and parallel with the bar of the permanent jaw and handle, substantially as described, in combination with the roset, or its equivalent, retained in its position relatively to the hand, in the manner described.

LORING COES.

No. 140. — *Improvement in the Machine for cleaning Wool from Burrs and other foreign matter, and also for Ginning Cotton.*

Having thus fully described the nature and operation of my machine for cleaning wool, cotton and other fibrous substances, I proceed to state what I claim as my inventions and improvements. I claim—

First. The machine as a whole, consisting in general of the constituent parts, in combination, as above described, and that though equivalents may be substituted for some of those parts for like purposes, and substantially the same, viz: the combination of the common feeding and picking apparatus with the comb toothed cylinder.

Secondly. I claim forming and arranging the teeth of cylinders for burring wool and cleaning cotton and other fibrous substances, in such a manner that their outer convex sides shall be substantially concentric with the axis of the cylinder, for the purpose of seizing and holding the fibres, and presenting a surface against which the guard can act in removing burrs and other foreign matter therefrom.

MILTON D. WHIPPLE.

No. 141.—*Improvement in the manufacture of Indian Rubber Goods by means of Zinc Compounds.*

We here disclaim the use of rubber and sulphur alone, as also the submitting of rubber or rubber compounds to a high degree of heat; neither do we wish to secure the right of coloring rubber, such having frequently been done by rubber manufacturers.

But what we do claim as our invention and desire to secure by letters patent, is India rubber fabrics made by the combination of caoutchouc, in its several varieties, with zinc compounds, in their several forms, as herein set forth, and sulphur; and in combination with these, the submitting our compound to the action of a high degree of heat; the whole being combined and manufactured substantially as above described.

H. G. TYER.
JOHN HELM.

No. 142.—*Machine for Breaking Coal.*

What I claim therefore as my invention and desire to secure by letters patent, is the arrangement of the teeth on the two rollers, substantially as herein described, so that in their rotation the teeth of one shall come opposite the spaces between the teeth of the other, with sufficient space between to hold lumps of the required size, the rollers being so combined by gearing as to make them rotate in opposite directions, and with the required velocities, to retain the relative position of the teeth of the two rollers, as described.

JOSEPH BATTIN.

No. 143.—*Improvements in Looms for weaving Carpets and other figured Fabrics.*

Having thus fully described the manner in which I construct and arrange the respective parts of my loom for weaving carpets, and shown the manner in which the same operates, what I claim as new and desire to secure by letters patent, is—

First. In connection with the power loom, depressing one trap board, (or more,) whilst the other (or corresponding trap board or boards) is elevated, substantially as described.

Second. I claim placing and working the journals above the trap boards, substantially in the manner and for the purpose specified.

Third. I claim working the card prism of the jacquard by a cam, (or the equivalent thereof,) connected with the loom or deriving motion therefrom, and whilst the trap boards are at rest, substantially as described.

Fourth. I claim regulating the delivery or giving out of the warps, by the tension of the warps or chain, acting on a vibrating roller, (or the equivalent

thereof,) in combination with a regular and positive take-up motion, for taking up the woven cloth, substantially as described.

Fifth. I claim the employment of a series of shuttle boxes and a receiving shuttle box, on each side of the loom, and supported in a separate and independent frame by the side of the loom, substantially as described.

And, lastly, I claim stopping the loom, when a change of colors is required, by combining the shipper (or the equivalent thereof) with the jacquard, substantially as described.

E. B. BIGELOW.

No. 144.—*Improvement in Brussels Looms.*

Having thus declared the nature or character of my invention, specified the construction and operation thereof, and pointed out the various modes in which I have contemplated the application of the several principles, what I claim as my invention and desire to secure by letters patent, is—

First. Giving to the two parts of the mechanism that which weaves the cloth or forms the body of the fabric, and the one which operates the figuring wires, a separate and distinct organization, substantially as described, when these are connected and confined by an intermediate mechanism, which shifts the motive or driving power from one to the other, substantially as described.

And in combination with this, I claim also the employment of the two brakes to arrest the momentum of the moving parts, to prevent any conflict in the operations of the two parts of the mechanism.

Second. I claim, in combination with a loom for weaving such looped fabrics as herein designated, the employment of a box, trough, or the equivalent thereof, for receiving and holding the figuring wires preparatory to their being introduced under the figuring warps, substantially as described.

Third. I claim the fingers, or their equivalents, which receive the figuring wires from under the pile or figuring loops, in combination with the trough, box or the equivalent thereof, into which they are deposited preparatory to the introduction of them under the figuring warps, substantially as described.

Fourth. I claim in combination with the mechanism which withdraws the figuring wires from under the pile or figuring loops, the fingers or their equivalent for transferring the said wires to the trough, or the equivalent thereof, from which or by which they are transferred to the open shed of the figuring warps, substantially as herein described.

Fifth. I claim the method substantially as herein described, of introducing and dropping the figuring wires in the open shed of the figuring warps, as described.

And finally, I claim the method substantially as herein described, of supporting the figuring wires in the open shed of the figuring warps when they are being introduced, as described.

E. B. BIGELOW.

No. 145.—*Improvement in Power Looms.*

What I claim as my invention and desire to secure by letters patent, is—

First. Combining with the lay of a power loom, and on each side thereof, two cams and two rollers, or their equivalents, one of said cams for working the lay, and the other for holding it in a stationary position during the throw of the shuttle, substantially in the manner and for the purpose specified.

Second. The employment of two series of shifting shuttle boxes, on one or both sides of the lay, hung and operated in separate and independent frames on each side of the lay of the loom, the said boxes being shifted and otherwise operated by machinery receiving motion from the loom, or from some first or other mover, working in unison with the power loom, substantially as herein described, and for the purpose specified.

Third. Combining with the shipper for stopping the loom when the shuttle fails to pass through, or the equivalent thereof, a protector for each series of shifting shuttle boxes, hung in separate frames independent of the lay, substantially as described, and for the purpose specified.

And lastly, in combination with the lay of the loom, and shuttle boxes hung in separate frames, independent of the lay, the employment of jointed guides, substantially as described, for guiding the shuttles in their passage from the shuttle boxes to the lay, and vice versa, and which yield to prevent breaking when the shuttle fails to pass entirely through, substantially as described.

E. B. BIGELOW.

No. 146.—*Improvements in Power Looms for weaving Plaids, &c.*

First. What I claim as my invention and desire to secure by letters patent, is regulating the delivery of the unwoven warps, as required for the weaving of the cloth by the tension of the said warps, substantially as described, in combination with a brake or stop motion, substantially as described, to prevent the tension given to the warps by the beat of the lay from affecting the delivery motion, as set forth.

Second. I also claim in combination with the method of regulating the delivery of the warps by their tension, and controlled by a brake, the taking up of the woven cloth by a regular and positive motion, substantially as described, that the figures produced thereon may be regular and well matched, the irregularities of the weft threads being by this means taken up in the thickness, instead of the length of the cloth.

Third. I also claim in combination with the roller, of a positive and regular take-up motion of a weaving loom, the measuring wheel and hand or pointer, operated substantially as described, whereby the quantity of cloth woven is at all times indicated as described.

Fourth. I also claim communicating the shifting motion for shifting the shuttle boxes up and down when a change of color is required in the weft, by the gravitating force of a weight or the equivalent thereof, substantially as described, whereby all injury to the mechanism is avoided, should anything be interposed to arrest the motions of the moving parts, as described.

Fifth. I also claim arresting the motion of the shuttle, and relieving the picker from the end thereof, preparatory to the shifting of the shuttle boxes, by combining with the lay and picker, a spring lever, one arm of which moves in a slot or the equivalent thereof, to give it the required motion, substantially as described.

Sixth. And lastly, I claim stopping the loom and arresting the momentum of the moving parts at a given and determined point, by means of a lever which when the weft thread is not carried through, is brought into contact with a spur on the crank shaft, or the equivalent thereof, which forces it back to shift the belt when this is combined with the fingers which enter recesses in the lay, and which, when the weft thread is carried through, are pushed forward, to prevent the lever from stopping the loom, as described.

E. B. BIGELOW.

No. 147.—*Improvements in Looms for weaving Brussels Carpets, &c.*

Having fully described my improvements, what I claim as new and desire to secure by letters patent, is guiding and supporting the pile wires, as they pass between the warps, by means of a guide or guides, through, or on which the said wires slide, as above specified, or in any other way substantially the same.

E. B. BIGELOW.

No. 148.—*Improvement in Winnowing Machines.*

Having thus fully described the nature, construction and operation of my invention, what I claim therein as new and desire to secure by letters patent, is forming the feeder with slats, one below the other in its bottom and openings between them, the whole being made in this or any equivalent way for the purpose described.

I also claim the separating riddle, the shelf (*t*,) for regathering and refeeding the grain and cheat, for the purpose described.

I also claim giving the separating riddle (*h*,) and screen (*i*,) a rear vertical motion, in the manner and for the purpose described, whether the motion be given to each separately or conjointly.

JOHN THUSTON.

No. 149.—*Improvement in Seed Planters.*

We wish it to be understood that we do not claim the separate or individual action of the seed tubes, independently of the seed rollers and hoppers; but what we do claim as our invention and desire to secure by letters patent, is—

First. The simultaneous throwing into and out of operation, by the movement of a lever or other mechanical equivalent or device, each seeding cylinder and its respective drill or seed tube, for the purpose of sowing with any number of hoppers and drills, that may be required in sowing point or other irregular shaped land, without stopping the animal or animals attached to the machine: not intending to limit ourselves to the particular construction herein described and represented in the annexed drawings, but to vary these in any way that we may deem proper, so that the before described results are effected by means substantially the same as those described in the foregoing specification.

Second. We also claim the arrangement of the spur wheels, for the purpose of connecting the seed rollers Y, and hoppers P, to the shaft O, as before described, in such manner that they can be disengaged or engaged at pleasure, whilst the machine is in motion.

MOSES PENNOCK.
SAMUEL PENNOCK.

No. 150.—*Improvement in Looms for weaving Brussels Carpeting, &c.*

Having fully described my improvements in the foregoing specification, what I claim as new, and desire to secure by letters patent, is—

First. Giving to the lathe of the power loom a counter motion to vary the extent of its approach towards the face of the cloth at any required beat; to properly lay the filling, to form the pile of the cloth or clear the shed as above specified.

Secondly. Moving the trough or grooved bar, which is employed to carry the pile wires under the warps (or the equivalent thereof,) forward towards the face of the cloth, to clear the shed as above described, or in any other way which shall accomplish the same end by substantially the same means.

E. B. BIGELOW.

No. 151.—*Mill for Rolling Irregular Shapes by means of a Cam Pattern.*

Having thus fully described my improved apparatus for rolling metal to an irregular thickness by pattern, I wish it to be understood that I do not claim moving the top roller up and down by a pattern, that having already been done, but what I do claim as my invention and desire to secure by letters patent, is the employment of cams, as herein described, for elevating or depressing one of the rollers of a rolling mill, in combination with gearing the same as above set forth, so that a pattern of any length on the cam, may be made to effect the surface of any given length of bar, in proportional ratio, by change of the relative size of the gearing, by which I avoid in rolling long bars, any long patterns, difficult to handle and expensive to construct.

JOHN S. HALL.

No. 152.—*Improvement in Fire Proof Safes.*

Having thus described our improved concrete safe, what we claim therein as new, and desire to secure by letters patent, is joining the interior and exterior cases by the door frame, and connecting both cases with the insulating cement, by means of the anchors embedded therein, substantially as herein set forth.

We likewise claim the employment (in chests so joined,) of hydraulic cement as the insulating substance for fire proof safes or chests, it being stronger when concreted than other cements heretofore used for the purpose, thus making a safe of superior strength and durability, especially when the same is constructed in the manner herein described.

EDWARD HALL.
JOSEPH L. HALL.

No. 153.—*Improvement in Harvesting Machines.*

I do not claim to be the inventor of the turning alternating rake and slotted double platform; but what I do claim as my invention and desire to secure by letters patent, is alternating the rake and elevating and depressing its teeth, by devices made, arranged and operated substantially as herein described.

I do not claim to be the inventor of a tight case for the back of the blade to run in, nor of the slotted teeth to protect its edge; but what I do claim, is making a toothed blade case, in uniform sections (*c*, Fig. 2,) each section having a tooth cast in one piece with it, the whole being attached to the rack bar (*a*, Fig. 2,) by screws or otherwise, in such manner that if the tooth or of any section should get broken, it may be readily replaced by an extra one, cast from the same pattern, and kept on hand for that purpose; the rack thus made being equally efficient as a solid case, to protect the stock from dirt and obstructions and can be more easily and cheaply repaired.

I also claim the manner in which the position of the point of draught is changed by means of the slides (b^4 and c^4, Figs. 3 and 4,) and clamp screws (D' and *c*, Fig. 3,) as herein set forth

FRANCIS S. PEASE.

No. 154.—*Method of attaching Sectional Boats to each other by means of a Rule joint.*

What I claim as my invention in the foregoing, is the connecting of canal boats by rule joints for the purpose of adapting them to the curvature of the canal, and of steering them by their action upon each other, upon the same principle with that by which a rudder is made to steer an ordinary boat. I do not claim the invention of portable section boats herein before described.

JOHN ELGAR.

No. 155.—*Improved Cushion for Billiard Tables.*

What I claim as my invention, and desire to secure by letters patent, is constructing a billiard or bagatelle table cushion, consisting of an air tight elastic tube formed upon and to be used in combination with a solid but flexible and elastic core, which core shall remain within the tube and be permanently a part of the cushion, such cushion to be used inflated with air, whenever extraordinary elasticity is required, or on the other hand, capable of being used as a solid elastic cushion, whenever through accident or choice the tube part is permitted to loose the air by which it was inflated.

I also claim the application of air or gas in a tube or tubes of India rubber or other elastic material, to form the cushion of a billiard or bagatelle table, as described. I also claim the mode of extending the tube or cushion in one length around the table, in consequence of which the tubes or cushions may be inflated at the same time with one air pump, whereby all parts are equally inflated, and are of equal elasticity.

ABM. BASSFORD.

No. 156.—*Improvement in processes for the manufacture of India Rubber.*

What I claim as my invention and desire to secure by letters patent, is the curing of caoutchouc or India rubber, by subjecting it to the action of a high degree of artificial heat, substantially as herein described, and for the purpose specified.

And I also claim the preparing and curing the compound of India rubber, sulphur and a carbonate or other salt or oxide of lead by subjecting the same to the action of artificial heat, substantially as herein described.

CHARLES GOODYEAR.

No. 157.—*Improvement in Felting India Rubber with Cotton Fibre.*

What I claim as new and of my invention, is incorporating the fibres of cotton or other substance with India rubber, by pressing the fibres of a fleece or bat of cotton or other fibrous substance into a sheet of India rubber in the green state, without subjecting the fibres, after they have been incorporated, to a stretching or drawing operation, substantially as herein described.

CHARLES GOODYEAR.

ADDITIONAL IMPROVEMENTS

No. 88.—*Improved Right or Left Hand Lock.*

What we claim as our invention and desire to secure by additional letters patent, is the constructing the lock tumbler of two parts C, C, of such a form and combined with each other and with the arms *b*, *b*, of the lock bolt, in such a manner in relation to the key holes F, F, placed in reversed positions near each end of the lock, that a key will operate the tumbler and bolt equally well when inserted into either of the said key holes, substantially in the manner herein set forth.

L. R. LIVINGSTON.
J. J. ROGGEN.
CALVIN ADAMS.

No. 89.—*Improved Lever Scale for Canals, Railroads, &c.*

Having thus fully described our additional improvement, what we claim as new therein and desire to secure by letters patent, is two or more angular or bell crank levers, in combination with a reversed angular lever, to be connected together by rods, substantially as herein described, and placed on each side of the top or base of a lock, dock, canal, or other desired place, said levers to be connected to a graduated beam, and by the multiplication of which levers, a scale may be formed strong enough for any purpose, and weighing with entire accuracy, dispensing with the right or horizontal levers, as described in our letters patent for improved lever scale, which letters patent are dated February 6th, 1849.

ELY ELLICOTT.
SAMUEL A. ABBOTT.

No. 90. — *Improvement in Machines for Thrashing and Cleaning Grain.*

Having thus fully described my improvements, what I claim and desire to secure by this addition to my letters patent, is—first, the modification of the shoe, by the employment of the cover *(x,)* as herein specified, to the upper spout, and forming an offset and opening at *(y,)* together with the spout (N′,) as above described.

I also claim the concave, made adjustable and reversable in the manner and for the purposes set forth in the above specification.

B. G. H. HATHAWAY.

No. 91.—*Improvement in Seed Planters.*

Having thus described my improvements, what I claim therein as new and desire to secure by letters patent, is hinging the teeth to the frame or beam, and bracing them by flexible struts, which possess sufficient rigidity to resist all ordinary strains to which the teeth are subjected, without flexing, but which suddenly yield and allow the teeth to turn back when they meet with an obstruction which would otherwise break or stop the machine, as described and represented.

J. D. WILLOUGHBY.

No. 92.—*Improvement in Harness Saddles.*

What I claim as my improvement, and desire to secure by letters patent, is a flexible pad rigidly connected with the saddle tree, substantially in the manner herein set forth.

JOSEPH W. BRIGGS.

DESIGNS

No. 209.—*Design for Stoves.*

Having thus described my new design, I shall state my claim as follows: What I claim as my invention or production, and desire to have secured to me by letters patent, is the combination of ornamental mouldings and carvings or configurations herein above described and represented in the drawings, for the side and back plates of a cooking stove.

N. P. PECK.

No. 210.—*Design for Stoves.*

What I claim and desire to secure by letters patent, is the production of a new set of stove patterns, herein described in the accompanying drawings.

HENRY C. FAY.

No. 211.—*Design for Stoves.*

What I claim as my invention and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms, represented in the drawings, making an ornamental design for a cooking stove.

SAMUEL W. GIBBS.

No. 212.—*Design for Carpets.*

Having thus fully described my design for carpets and other similar fabrics, I desire to secure the same by letters patent, a full illustration being given in the drawing accompanying.

PETER LAWSON.

No. 213.—*Design for Carpets.*

Having thus fully described my design, and illustrated the same by the accompanying drawing, I claim and desire to secure the same by letters patent.

PETER LAWSON.

No. 214.—*Design for Carpets.*

What I desire to secure by letters patent, is the above described design, for weaving into carpets and other similar fabrics, as fully set forth in the accompanying drawing.

PETER LAWSON.

No. 215.—*Design for Furniture Ornaments.*

What I claim as my invention and desire to secure by letters patent, is the above described design, called Major Heyward, as fully set forth in the drawing hereunto annexed, and the use thereof, as a furniture ornament, in whatever manner the same may be applied.

ISAAC F. BAKER.

No. 216.—*Design for Furniture Ornaments.*

What I claim as my invention and desire to secure by letters patent, is the above described design, called *Cora Munro*, as fully set forth in the drawing hereunto annexed, and the use thereof for ornamenting furniture, in whatever manner or in whatever combination the same may be applied for that purpose.

ISAAC F. BAKER.

No. 217.—*Design for Stoves.*

What I claim as my invention and desire to secure by letters patent, is the new and useful design for cooking stoves, (which I call "the Republic,") as appears from the foregoing specification and the drawings attached thereto.

GEORGE E. WARING.

No. 218.—*Design for Stoves.*

Having thus distinctly represented and described the nature and arrangement of the respective ornaments and figures upon the side plates of my cooking stove,—

What I claim as new and desire to secure by letters patent, is the configuration and arrangement of said ornaments, as herein designated and represented.

CHARLES J. WOOLSON.

No. 219.—*Design for Stoves.*

I do not claim the back plate and its ornaments, but what I do claim as my invention and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms, represented in the annexed accompanying drawing, making an ornamental design for a coal stove.

ABRAM HANEY.

No. 220.—*Design for Stoves.*

What I claim as my invention and desire to secure by letters patent, is the combination and arrangement of ornamental forms and figures, represented in the accompanying drawings, forming an ornamental design for a cooking stove.

S. H. RANSOM.

No. 221.—*Design for Stoves.*

What I claim as my invention and desire to secure by letters patent, is the design of an air-tight wood parlor stove, as shown and described in the specification and drawings, figures B, C, D, E.

ABRAM HANEY.

No. 222.—*Design for Stoves.*

What I claim as my invention and design to secure by letters patent, is the ornamental design of stove plates for a cooking stove, as represented in the accompanying drawing.

SAMUEL W. GIBBS.

No. 223.—*Design for Stoves.*

Your petitioner claims to be the original inventor or producer of the design and ornamental part of said stove.

CHARLES W. WARNICK.

No. 224.—*Design for Stoves.*

What I claim as my invention and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the drawings, the same forming an ornamental design for an elevated oven.

S. H. RANSOM.

No. 225.—*Design for Stoves.*

What I claim as my invention and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms, represented in the annexed drawings, making an ornamental design for an air tight parlor stove.

S. H. RANSOM.

No. 226.—*Design for Stoves.*

My claim is limited to the design, as represented in the foregoing specification.

S. W. GIBBS.

No. 227.—*Design for Cooking Stoves.*

Having thus described my new design, I shall state my claim as follows:

What I claim as my invention or production and desire to have secured to me by letters patent, is the combination of mouldings, panels, or ornamental carvings or configurations, herein above described and represented in the drawings for the several doors and other parts of the front and bottom plates of the "Bay State coal cook stove."

A. C. BARSTOW.

No. 228.—*Design for Stoves.*

Your petitioners claim to be the original inventors or producers of the design and ornamental part of said stove.

WILLIAM B. CLINE
S. HILL.

No. 229.—*Design for Stoves.*

What we claim as new and our invention, and desire to secure by letters patent, is the above described and represented ornamental design for coal and wood parlor stoves.

JOSEPH G. LAMB.
CONRAD HARRIS.

No. 230.—*Design for Stoves.*

What I claim as new and desire to secure by letters patent, is the design and configuration of an ornamental parlor stove, as set forth.

WM. L. SANDERSON.

No. 231.—*Design for a Portable Grate.*

Having thus described my improved design for the front of a portable grate I shall state my claim as follows:

What I claim as my invention or production, and desire to have secured to me by letters patent, is the combination of ornaments on the three sided frame and blower, forming the front of a portable grate consisting of the swelled moulding *a a a a*, with sunken ovals and circles, the cross panel and gothic panel *e e e e*, and pilaster *g g*, and *l l l l*, on the said frame, and the similar gothic panel on the blower, all as herein before described and represented in the accompanying plate of drawings.

APOLLOS RICHMOND.

No. 232.—*Design for Stoves.*

Having thus fully described my improvement, what I claim therein as new, and for which I desire to secure letters patent, is the above described ornamental design and configuration of the plates, as described and represented.

JAMES WAGER.

No. 233.—*Design for Stoves.*

I claim as my invention or production, the above described and illustrated designs for six plate stoves, and desire to secure the same by letters patent.

JAMES WAGER.

No. 234.—*Design for Stoves.*

What I claim as my invention and desire to secure by letters patent, is the ornamental design of a stove plate, substantially as herein described and represented.

CALVIN FULTON.

No. 235.—*Design for Stoves.*

What I claim as new and desire to secure by letters patent, is the design and configuration of an ornamental stove plate, as herein described and represented in the annexed drawing.

GEO. W. CHAMBERS.

No. 236.—*Design for Stoves.*

What I claim as new and desire to secure by letters patent, is the design and configuration of an ornamental stove plate, as herein described, and represented in the annexed drawing.

GEO. W. CHAMBERS.

No. 237.—*Design for Stoves.*

Having thus fully described and represented the configuration and decorations of my ornamental design for a cooking stove, and disclaiming the mere details of ornament separately taken, what I claim as my design or production, and desire to secure by letters patent, is the combination of moulding and other ornaments, as applied, substantially according to the description of the several doors, panels, &c.

S. H. BURTON.

No. 238.—*Design for Stoves.*

What we claim as our invention and desire to secure by letters patent, is the configuration and arrangement of the ornaments herein described on the several plates of the stove.

SHERMAN S. JEWETT.
F. H. ROOT.

No. 239.—*Design for Stoves.*

What I claim and wish to secure by letters patent, as original with me, is the arrangement and combination of the several original and ornamental figures and mouldings upon this particular stove design, as herein described, and as represented in the annexed drawings.

WILLIAM SAVERY.

No. 240.—*Design for Stoves.*

What I claim as my production and ask to have secured to me by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawings, making an ornamental design for a parlor stove. S. W. GIBBS.

No. 241.—*Design for Stoves.*

Having thus described my invention of a design, I claim the ornamental border on the front plate A, the ornamental panels E, on the ash box B, the cornices G, on the top plate F, the grate ring H, with its chasing I, on it, and the foot or feet D, of the stove, as represented in figures 4 5 6 and 7, to produce a new and beautiful design for a stove, as set forth.

EDWARD B. FINCH.

No. 242.—*Design for Stoves.*

What I claim and desire to secure by letters patent, are the above described and illustrated designs for stoves. JAMES WAGER.

No. 243.—*Design for Air-tight Stove.*

What I claim as my invention and desire to have secured to me by letters patent, is the combination of the several ornamental mouldings, with the ornamental scrolls and clustered arrow-heads, cast in open work, and the whole forming a new design for the said top plate of a parlor air-tight stove.

MOSES POND.

No. 244.—*Design for Stoves.*

Having thus fully described and distinctly represented the shape or configuration, and the several ornamental designs for the panels, sides and doors of a cooking stove, what I claim as new therein and desire to secure by letters patent, disclaiming the mere details of the ornaments separately taken, is the combination of the ornaments and moulding as applied, according to the description to the several parts and configuration of stove, substantially as represented and set forth. HOSEA H. HUNTLEY.

No. 245.—*Design for Stoves.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the said drawing, making an ornamental design for an air-tight cooking stove.

JOHN F. RATHBONE.

No. 246.—*Design for Stoves.*

What I claim as my design and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawing, making an ornamental design for a wood stove.

JOHN F. RATHBONE.

No. 247.—*Design for Stoves.*

What I claim as my production and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms as represented in the accompanying drawing, making an ornamental design for an air-tight *cooking* stove. JOHN F. RATHBONE.

No. 248.—*Design for Stoves.*

What I claim as my invention and desire to secure by letters patent, is the design for a diving flue grate, as shown and described in the specification and drawings—figures A, B, C and D′.

ABRAM HANEY.

No. 249.—*Design for Stoves.*

What I claim as new and desire to secure by letters patent, is the design and configuration of ornamental stove plates, as herein described and represented in the annexed drawings.

SAMUEL CLARK.

No. 250.—*Design for Stoves.*

What I claim as new and desire to secure by letters patent, is the design and configuration of ornamental stove plates, as herein described and represented in the annexed drawings.

SAMUEL CLARK.

No. 251.—*Design for Stoves.*

What I claim as new and desire to secure by letters patent, is the design and configuration of ornamental stove plates, as herein described and represented in the annexed drawings.

SAMUEL CLARK.

No. 252.—*Design for Stoves.*

Having thus fully described and represented the configuration and decorations of our ornamental design for a cooking stove, what we claim as our design or production, and desire to secure by letters patent, is the particular configuration of mouldings around the edge of the doors, and the ornaments on their panels. We also claim the external plates of the stove, ornamented substantially as described and illustrated in the accompanying drawings. We also claim the ornamental pattern of leg, as shown.

CHARLES GUILD.
D. F. GOODHUE.

No. 253.—*Design for Stoves.*

Your petitioners claim to be the original and first inventors or producers of the combination of the ornamental figures constituting one design, as herein set forth.

WILLIAM B. CLINE.
SAMUEL HILL.

No. 254.—*Design for Stoves.*

What we claim as new and our invention, is the combination and arrangement of the above represented and described mouldings, panelings and configurations into an ornamental design for premium cooking stoves, and to be known and called as "Lamb and Harris' Patent Ohio Premium."

JOSEPH G. LAMB.
CONRAD HARRIS.

No. 255.—*Design for Stoves.*

What I claim as new and desire to secure by letters patent, is the design and configuration of an ornamental parlor stove, substantially the same as described and represented in the hereunto annexed drawings.

WM. L. SANDERSON.

No. 256.—*Design for Girandoles.*

I claim the said design or pattern, or combination of ornamental parts composing the same, in their arrangement in relief, as above described and as exhibited in the drawings.

WILLIAM F. SHAW.

No. 257.—*Design for Stoves.*

Having thus fully described the ornaments of my stove, what I claim therein as new and desire to secure by letters patent, is the combined ornamental design and configuration of stove, substantially as herein set forth and represented in the accompanying drawings.

HOSEA H. HUNTLEY.

III.

EXAMINERS' AND MACHINIST'S REPORTS.

PATENT OFFICE, January 1st, 1850.

Hon. THOMAS EWBANK,
Commissioner of Patents.

SIR:—In compliance with your request, I have the honor herewith to report proceedings in the discharge of my official duties during the past year.

The whole number and arrangement of classes and subjects before the office, are as follows:—

Class 1.—Agriculture, including instruments and operation.

Class 2.—Metallurgy and manufacture of metals and instruments therefor.

Class 3.—Manufacture of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper, &c.

Class 4.—Chemical processes, manufactures and compounds, including medicine, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.

Class 5.—Calorific, comprising lamps, fire-places, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel.

Class 6.—Steam and gas engines, including boilers and furnaces therefor, and parts thereof.

Class 7.—Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging and propulsion; diving dresses, life-preservers.

Class 8.—Mathematical, philosophical and optical instruments, including clocks, chronometers.

Class 9.—Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs.

Class 10.—Land conveyances, comprising carriages, cars and other vehicles used on roads, and parts thereof.

Class 11.—Hydraulics and pneumatics, including water-wheels, wind-mills, and other implements operated on by air and water, or employed in raising and delivering fluids.

Class 12.—Lever, screw and other mechanical power, as applied to pressing, weighing, raising, and moving weights.

Class 13.—Grinding-mills and mill gearing, containing grain mills, mechanical movements and horse powers.

Class 14.—Lumber, including machines and tools for preparing and manufacturing; such as sawing, planing mortising, shingle and stave, carpenters and coopers' implements.

Class 15.—Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements and other building materials.

Class 16.—Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness.

Class 17.—Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing.

Class 18.—Arts—polite, fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry.

Class 19.—Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder.

Class 20.—Surgical and medical instruments, including trusses, dental instruments, bathing apparatus.

Class 21.—Wearing apparel, articles for the toilet, &c., including instruments for manufacturing.

Class 22.—Miscellaneous.

Class 23.—Designs.

Of the above twenty three classes, seven are apportioned to me for examination, viz:—

Class 5.—Calorific

Class 8.—Mathematical and philosophical instruments, &c.

Class 12.—Lever and screw power, &c.

Class 15.—Stone and clay, &c.

Class 18.—Arts—ornamental, &c.

Class 20.—Surgical and medical, &c.

Class 23.—Designs.

The whole number of applications referred to me, during the past year, is 481; 129 of these have been included in class 5; 43 in class 8; 35 in class 12; 23 in class 15; 46 in class 18; 47 in class 20; 74 in class 23; in other classes 84.

At the commencement of the year, there were 79 applications on my desk, waiting their turn for examination, at present there are 9.

Of the number of applications before me during the year, there have been—cases of interference 8; re-issues 7; extensions 3; additional improvements 5; appeal 1.

CLASSIFICATION OR DIVISION OF SUBJECTS.

The classification of inventions is a difficult matter in itself, from the fact that many of them are anomalous in character, while others are complex, or of a mixed nature, and might with propriety from any natural division of the subject be attached to any one of several classes. In the published digest of patents, the order of subjects has never yet been observed in strict accordance with the practice of the examiners, and its many defects and incongruities in this respect have led to frequent misapprehensions, and are well worthy of your attention with a view to future reparation. From the foregoing remarks it is obvious that a classification founded upon generic or specific distinctions cannot be completely carried out, although this is done in the main, the destination of doubtful cases being determined by common agreement. Prior to the late increase in the number of examiners, the whole range of subjects was *divided* between two examiners, imposing upon each the perplexing task of

investigating subjects as multifarious as the workings of inventors' brains. The labor in this respect is now much simplified, though the constant increase of business requires severe and unremitting effort. Out of the 23 classes, I have now 7, but the subjects are not so heterogeneous as formerly, and during the past year a smaller number of applications have fallen to my lot, than to some other examiners.

PHILOSOPHICAL INSTRUMENTS, ETC.

Electro Magnetic ore Separator.—It is an old practice to separate iron filings from dust and particles of other metals, and also iron from its ore, by means of powerful magnets, the magnets in some cases being drawn through the mixed mass by hand, and then shaken or brushed, and in others the magnets have been attached to the periphery of a wheel or a drum, and either the mass has been dropped upon the revolving wheel upon one side, and the adhering iron removed by stationary brushes on the opposite side, or the magnets have been carried through the mass below, and the iron brushed off as before into a trough. By a process similar to this, the finest black sand has been prepared for many years. Much of the black sand now in use is colored, and is common siliceous sand, but the best article is a ferruginous sand, separated by magnets from the white, red and other colored siliceous particles. The ore separator which has been patented, uses electro instead of permanent magnets, rows of them being attached to a drum, the coils of wire surrounding the magnets being connected with a galvanic battery in the usual way, by one extremity, while the other is connected with a break piece or cut-off, in such a way as to charge the magnets while passing through the ore, and discharge them at the proper time for dropping the adherent mass of iron, and depositing it in a trough which is inclined, to convey it to its proper destination. The mixed mass of ore and earth is conveyed from under a hopper upon an endless belt, to the electro magnets.

Telegraphs.—A variety of inventions under this head, have been presented to the office, most of them based upon the electro-magnetic telegraph, or nearly related thereto. Prominent among these is the electro-chemical telegraph. Two patents have been granted for inventions of this kind, one of which has already gone into practical operation, to a considerable extent. These inventions were adjudged by the office to interfere with each other, and upon a hearing, priority of invention decided in favor of one of the parties. Upon appeal however, to the usual tribunal, it was decided that the alleged interference did not exist, and patents were ordered to issue to both parties. The whole case was one of unusual interest, involving many intricate and important questions, and although the whole proceeding was prior to your accession to the office, yet the leading features are doubtless by this time familiar to you. The parties, Sam'l F. B. Morse and Alexander Bain, came into the contest for priority of invention upon unequal grounds, the former being a citizen of the United States, and the latter a foreigner. It was held by your predecessor in office, that under the law a foreigner could not go behind his foreign patent or printed publication for evidence of his invention, and upon reference of this subject to the Attorney General, the opinion of the commissioner was confirmed. It was also held that in a contest for priority of invention, the sealing of a foreign patent was not to be taken as proof of invention, and that proof of enrolment was alone adequate. On the appeal to Chief Justice Cranch, the parties appeared by counsel, who occupied some

days in elaborate and lengthy arguments. It was, I believe, the first trial of appeal from the office, had in open court, and the whole case has been faithfully reported and printed at the expense of one of the parties. The report will be read with much interest by inventors and professional men.

The operation of the electro-chemical telegraph depends upon the chemical re-agency of the galvanic current. Marks or stains are made upon paper through which the galvanic current is made to pass, the paper being first saturated with some neutral or other salt, and moistened at the time to give it sufficient conducting power. The advantage claimed for this over the electro-magnetic telegraph, is that it may be worked with much greater rapidity. In the electro-magnetic telegraph a signal is made by the development of electro-magnetism, and the consequent movement of a small bar of iron, both of which operations require appreciable time. In the chemical telegraph the production of the stains or marks is commensurate with the passage of any portion of the galvanic current; for, according to the best authorities, the current could not pass through the salt without decomposition. The change of colors, as indicated to the eye, may not be so sudden as the transit of the current, but if it should not be so in fact, it becomes so practically, as the marks are not required to be seen at the instant of decomposition. I am not informed upon this point, but it is immaterial; the practical distinction between the chemical and electro-magnetic telegraph being this, that as it requires time to change and discharge an electro-magnet, and also to overcome the inertia of moving parts, there must be a limit in practice to the rapidity of making signals, while in the electro-chemical telegraph, the limitation would depend upon other causes, and the rapidity of action would probably far exceed the ordinary mechanical facilities for communicating signals. With a view to avail himself of this greater capability of this telegraph over the above, one inventor has patented a means of preparing and transmitting communications much more rapidly than the ordinary manipulations with the key. To accomplish this, strips of paper are perforated by machinery, in such a manner that the perforations may correspond to the signs representing the letters, figures or words, and by means of these perforations and the intervening spaces, or whole portions of the paper, the circuit is broken and closed with as great rapidity as a slight spring pressing upon the strip of paper can be made to act. It is only necessary that the motion of the paper at the other end of the line which is to receive the communication should move with a corresponding rapidity. In practice it has been found that the rapidity of execution is much less than it should be theoretically; but, nevertheless, it is far greater than with the electro-magnetic telegraph. With this, as with all the plans for telegraphs hitherto undertaken, a difficulty of some importance has been encountered, from the imperfect insulation of the wires, although great pains have been taken to render the insulation as complete as practicable, and several patents have already been taken out for telegraphic insulators. As the insulated supports for the wires have to sustain a considerable weight, they must be made of considerable strength; and, moreover, as they have been made the sportive targets of lawless boys, and objects of less wanton though more malicious mutilation by mischievous men, it has been found necessary to give a due share of attention to strength and safety in this respect, and in so doing some sacrifice of insulating properties have been thus far deemed necessary. A curious result follows from this want of insulation. If it be assumed that the air is impervious to galvanic electricity, all that can return to its source between

two distant stations, without travelling the whole distance, must pass down each post on the line, and can only reach the post through the substance of the insulating material employed, or along its surface in case it should be moist. A greater amount of electricity will pass down those posts nearest the station where the battery is in operation, and at the extreme end of the line only a feeble portion will pass through the instruments. The consequence of this has been, that upon the conductors being moistened upon their surfaces, the instruments at the distant stations would work with unequal power, and occasion much embarrassment. This difficulty is in some measure remedied, by having batteries at each end of the line, or at every station, although the defective insulation still exists for each. I am inclined to think, however, that the air, when loaded with moisture, is a conductor of galvanic as well as of mechanical electricity, as indicated by my experiments, several years since, with the immense copper roof of the Patent Office, forming a great galvanic plate of upwards of 20,000 square feet of surface. If it is sufficiently so to be of practical value, it is obvious that entire insulation of telegraphic wires will be difficult to accomplish.

The crossing of rivers and large bodies of water, by means of submerged wires, does not seem yet to have been attained, and the chief obstacle thus far is imperfection in the methods of insulation. The plan which I proposed several years since appears to be worthy of trial. It consists in using a local circuit and battery of quantity at each river or body of water. The galvanic current employed on the main routes are of small quantity and high intensity, hence a slight defect of insulation in a submerged wire would be productive of a great loss. But by using a current of quantity and the lowest possible intensity, to be set off by a local magnet, I am inclined to think that a single wire laid in the river with the most ordinary preparations for insulation, would be effectual in establishing connection between the terminations of the great line on opposite sides of the river or other body of water. It has long since been proposed to connect the eastern and western continents by means of telegraphic wires laid down in the depths of the ocean, and lately the proposition has been revived with a venturesome and true American spirit. It does not appear in any way impracticable to stretch a wire from the American continent to England; and in the waveless depths of the interminable waters, the wire would be more secure from depredation than upon *terra firma*. From its weight it would sink beneath the realms of the living monsters, and lie far out of reach from the ruthless hand of mischief or speculating avarice. But the insulation of such a wire is a thing not easily conceived of, in the present state of our knowledge. Besides the mechanical niceties required to obtain a complete insulating covering for the wire, we should have to contend against the corrosive action of the sea water, and this too, at a point where its greater density would exalt its chemical agency. Much has been expected and promised from gutta percha as an insulator, but we have not been long enough acquainted with this curious substance to test its value for this purpose. It is indeed a most excellent electric and insulator, but I have seen several instances of its decomposition when exposed to air and moisture, and some cases of its entire destruction when in thin sheets. I have been recently informed that the decay of thin sheets of gutta percha is attributed to caustic meterials used in preparing it; however this may be, I have seen supports for telegraphic wires made from the pure gum, undergo in one season decomposition to such a depth as to form a bibulous mass upon its surface, and ma terially impair its non-conducting property. It resists, however, to a remark-

able degree the action of strong acids, and may be used with great convenience for funnels, syphons, &c., for transferring and holding even strong nitric acid. It may not be out of place here to mention its unfitness, when in very thin sheets, for models of patented inventions. During the past year a patent was granted for a surgical instrument, an essential part of which was a sac of gutta percha. In the course of a few months the entire sac had disappeared, having crumbled into powder.

American Indicating Disc Telegraph.—An instrument under this name has been patented, which presented some ingenuity and novelty in the mechanical arrangements, and also in the selection and use of signals. It is an optical or indicating telegraph, as its name purports, and in this particular must yield to the recording telegraphs. The signs are indicated by the figures 0, 1, 2, 3, 4, these being the only symbols used. These stand for the vowels, and the remaining letters are represented by combinations of these figures. The figures are arranged in four sets, upon the face and near the circumference of a disc, which revolves by means of a novel internal escapement, which is moved by a lever attached to the armature of an electro-magnet. Its language is less complex than that of other indicating telegraphs.

Pen Telegraph.—When Prof. Morse's telegraph was first essayed in this city, it recorded the signs upon a moving fillet of paper by means of a pen charged with ink, the pen being supplied from a reservoir or fountain. It was found difficult to regulate the flow of the ink, more especially as the motion of the pen was apt to *throw* the ink, as it was termed, and the pen was accordingly dispensed with, and a contrivance substituted, by which marks corresponding with those made by the pen were indented upon the fillet of paper. This required some mechanical force, and it became necessary to have a local registering magnet, as it is called, of some power to supply this force. In the new pen telegraph the inventor has ingeniously reversed the order of Morse's telegraph, and moves the paper to the pen, which is kept stationary, thus obviating the difficulty of throwing the ink and requiring a slighter force to move the paper than is now required to indent the paper. The pen is also fed by an ingenious contrivance. A lever or arm carrying a feeder which dips into a fountain of ink, is operated at the requisite intervals so as to move up to the pen and deposite upon a proper amount of ink, and then retire again to the fountain to recharge. This arm carrying the feeder is actuated by the clock work which is used to move the fillet of paper. It was thought that this invention would save the necessity of using a receiving magnet, and that the telegraphing might be performed directly by the use of one magnet merely to move the paper to the pen. If, however, it fails to supersede the receiving magnet, it can have no advantage to recommend its use.

Painting Telegraph Wires.—A patent has been granted for a machine, for painting telegraph wires, to preserve them from rust. The invention is notable not so much for intrinsic merit or novelty, but as marking the progress and rapid extension of the telegraph, by the introduction of labor saving machinery, in the manufacturing departments of the art. Attempts have also been made, to patent modes of insulating the wires, and of forming them into ropes of suitable size and strength; and although the telegraph might have, and in some cases, has been benefitted by their use, yet they were not in the category of novel inventions, and could not be patented.

Mode of sustaining Telegraph Wires across Rivers.—Many attempts have been made to improve this part of the telegraph system, and generally but little difficulty has been experienced, except where the wires and piers might be-

come an obstruction to navigation. If the piers are to be very far apart, there is danger of the wires breaking under their own weight, and more especially when loaded with ice. The plan in question proposes to suspend the wire to a cord of India rubber, stretched to its greatest tension or nearly so, or what is better, to inclose the wire in a tube, which is to be stretched over the wire, this would save much swagging of the wire, and as the India rubber is a very strong material in proportion to its weight, the invention appears feasible, and is at least very ingenious. I have not heard of its use thus far.

I have been somewhat lengthy and discursive on the subject of telegraphs, from the magnitude and importance of the invention, and its growing interest with the public, who will be gratified to follow closely every step of its development. The past year has been unfruitful in discovery, and in striking inventions. Political economists might attribute it to the distracted affairs of Europe, whence science has been wont to emanate, and to the visitation of pestilence and gloomy forebodings at home. But it is remarkable, that the close of the past year, and the few past days of the present, have shown symptoms of reviving energies in science, and its application to art, which will ring upon the year to come a cheering note of convalescence, and astound the public mind. Your examiners, and all engaged in the office, are interdicted from all communications, public or private, respecting unexamined and pending applications for letters patent. But I divulge nothing, and do no more than whet the keen edge of curiosity, by the prediction, that the coming year will be more fruitful than the past, both in discovery and invention. The world has never witnessed an invention so extraordinary in its conception and achievements, as the electric telegraph, carried to such a pitch of improvement and successful operation, in so short a time; but the end is not yet, and we shall soon see new powers and modifications brought into play, and this mysterious yet simple, infantile yet seemingly matured invention, is to receive new accessions, and grow into capabilities far exceeding our present expectations.

Signals upon Railways.—A patent has been granted for giving signals upon railroads, by means of electro-magnets, which may be considered a species of electro-magnetic telegraph. A spring or lever is so arranged upon the track, that when upon the passage of the cars, the spring is moved, it completes a galvanic connexion, with a wire to be connected with a given station ahead, where a concerted signal is shown by the operation of an electro-magnet, with a view to prevent collision of the trains. For instance, it may be readily understood, that the cars passing a certain point, may by ordinary telegraphic communication, convey that intelligence to any distance ahead, or in the rear if desired. On double tracks, such a device would not be needed, and it is evident, that if it cannot be made infallible, it would not answer in any case. A single failure to communicate, might mislead, and be the occasion of that very disaster, the invention was intended to obviate. From the frequent interruptions which occur in telegraphic lines, the invention could not at present be very reliable, and must be regarded as more ingenious than practical.

Railway Annunciator.—Another kind of indicator patented under the head of telegraphs, (although wanting the characteristic distinction of communicating at a distance) is an instrument bearing the above name. In principle, it is similar to an odometer, but might be appropriately termed an odoscope. The odometer is an instrument attached to the wheels of carriages, which by means of an index moved by a train of wheel work, shows the distance passed

over by the carriage; but this instrument is to show more than this, and informs the traveller where he is on the road, or the name of the place he is passing. For a taciturn people as we are, the invention may be styled an ingenious hit, where the travelling stranger is reluctant to ask, and every body appears too much absorbed to inform him of his whereabouts. The names of the various places on the route are marked upon a dial-plate, and the index or hand shows the cars to be at a certain place when it is over its name. The index revolves by a train of wheel work connected with the car wheel or axle, as in the ordinary odometer, the office of which it also performs. It has another convenience of giving notice to way passengers of the approach to their destinations, and to hold themselves in readiness for leaving the train without delay.

Education Tables.—A very ingenious and convenient device has been patented under this name, for facilitating instruction and practice in arithmetical calculations. Its details are not readily described, but its main features consist in a square board or table, furnished with a number of grooves, in which slide freely, little buttons or studs, having on their faces either figures or letters, or both. The buttons are so made that while they may be moved about easily in the grooves, they cannot be removed. The grooves are so arranged that a certain set of them is to be used for the calculation or spelling of words, while another set is to contain the letters or figures when not in use, and yet, whenever required, they can be moved at once to the scene of operation, without interfering with each other.

Calculating Machines.—Two machines for adding and subtracting numbers have been patented. The first of these has a fixed circle, graduated on its face into 100 equal parts, and numbered from 0 to 99. Concentric with this fixed circle are two moveable circular metallic plates, one within the fixed circle, the other surrounding it, and each pierced with 100 pin holes in its circumference, each pin hole standing directly against one of the numbers of the fixed circle. In operating, a pin is inserted into one of the pin holes of the inner circular plate, against that number on the fixed circle which indicates the units and tens of the number to be added, and the plate is then turned by carrying the pin round till it strikes a stop placed at the 0 of the fixed circle. This is repeated for each number to be added, and a square hole cut through the inner circular plate discloses the units and tens of the sum on a fixed graduated circle beneath. A similar square hole is cut through the outer circular plate, and discloses another set of numbers to indicate hundreds and thousands on a second graduated circle beneath. This second concealed circle, instead of being fixed like the before mentioned concealed one, moves backward one number for every complete revolution of the inner moveable circular plate, and thus adds one to the number of hundreds seen through the last mentioned square hole. If the number to be added contains hundreds and thousands, the pin is inserted into a pin hole of the outer circular plate against the number of hundreds and thousands, and the plate turned till the pin strikes another stop placed at the 0 of the fixed circle. The hundreds and thousands of the sum can then be seen through the square hole of the outer circular plate. This plate also bears a little roller, seen through another square hole in the plate, and which makes a tenth of a revolution for every complete revolution of the plate relatively to the graduated circle beneath it. The roller is numbered from 0 to 9, and shows the tens of thousands. It is connected with an additional small wheel bearing an adjustable index which indicates the hundreds of thousands of the sum.

The second instrument for the same purpose is very simple, though it will require greater effort of attention in its use than the preceding. It consists of a series of parallel sliders let into the face of a small piece of board with margins of suitable width left between them. These sliders play longitudinally beneath two stop bars crossing them at right angles, one at the right hand end of the board, the other near its middle. The space between the stop bars is divided into ten equal parts, and the nine points of division are numbered from 1 to 9 on the several fixed margins at the side of the respective sliders. These margins thus divided are called the indices. Through each slider are made nine equidistant pin holes, directly against the nine numbers on the indices, and the ten spaces thus formed are numbered on the slider from 0 to 9, and the series of pin holes is continued on towards the left, on each slider, till their number is at least doubled, and the additional space thus occupied is distinguished by coloring that part of the slider. Beginning with one side of the series of sliders, the first is made to represent units, the second tens, the third hundreds, &c. The sliders are operated by a pin inserted in the pin holes. The pin is inserted into the pin hole of the unit slider, against the number on the index denoting the units of the number to be added, and the slider carried to the right, till the pin strikes the right hand stop bar. The slider for tens is next moved in the same manner, by inserting the pin into the hole against the number on the index, denoting the tens of the number to be added, and the same process with the hundreds, thousands, &c. On making the addition of a second or more numbers, the pin is in like manner inserted into the hole of the unit slider against the number of units to be added on the index, and the slider again carried an additional move to the right, as before, and similarly with the tens, hundreds, &c. If, however, the sum should exceed 9 on any slider, it is known by the pin falling into a hole in the colored part of the slider, and in that case, the slider is not carried to the right, but to the left, till the pin strikes the left hand stop bar, and a unit must then be carried to the next higher digit of the number to be added. The units, tens, hundreds, &c., of the sum total will be found on their respective sliders at the side of the right hand stop bar. By a little practice, addition may be performed on this simple instrument with considerable rapidity. Neither this nor the preceding, however, can be of any practical utility, except to persons whose habits of mental computation are slow and inaccurate. Subtraction is performed on both instruments, by reversing the process for addition, but to great disadvantage, as the stops in both are then comparatively useless.

A Patent has been granted for an Instrument for measuring distances in reconnoissances.—Upon a tripod stand is mounted a horizontal axis, from which extends at right angles a radial arm, bearing at its extremity a telescope having its line of collimation parallel with the axis. The telescope is counterbalanced by weights on the opposite side of the axis. By making the axis revolve with the telescope and counterpoises, the telescope is with great facility and precision made to assume in succession two parallel positions, at the distance of twice the length of the radial arm on which it is mounted. On observing an object through the telescope in these two positions, the parallax will be apparent at a great distance, and its angular magnitude is measured by a micrometer attached to the telescope. The parallactic angle thus obtained gives the distance of the object, either by calculation or by reference to a table constructed for the instrument. It is said that this instrument may be made to measure a distance of forty or fifty

miles or more. If so, it must prove very valuable for reconnoissance in geographical surveys.

Clocks.—There would seem to be but little space left for improvement in clocks at the present day, but, like every other invention of man, it must have a long interval between a high degree of improvement and absolute perfection. Not much has been done towards filling this interval, but a patent has been granted for one improvement which may be of practical interest. This invention consisted in the employment of two coiled springs instead of one, to operate upon a pinion placed between them, for the purpose of equalizing the friction upon the bearings of the pinion. This device, or its equivalent, or certainly its analogue, is common in machinery, but it was deemed patentable in this instance, as, by its application to clocks, each spring could be made light, thin, and of better materials, in consequence of using two.

Spectacles.—Three patents have been granted for improvements in spectacles. The first to be mentioned is for a compound spectacle, or one in which several sets of glasses are used of different focal powers. There are several minor points claimed under this patent, but the principal feature is gearing the stems of the frames inclosing the glasses in such a manner that two glasses of one set shall move together and in unison. One other feature also of this invention is the mode of affixing the sliding handles in such a manner that they make a comparatively smooth joint, and avoid the annoyance so often experienced in common spectacles of catching in the hair.

The next patented improvement in spectacles to be mentioned is one in the slide merely, and accomplishes in a more perfect manner the object sought for in the last named invention. One half of each bow is made tubular, and the other slides within it with a neat fit, and the bows are not as heavy as in the ordinary spectacles, and there is, of course, no risk of entanglement with the hair.

The third improvement in spectacles relates to the lenses. Spectacles are frequently made with the upper and lower halves of the glasses separate, and of different focal powers. The dividing line is unsightly and unpleasant also to the wearer. The new method patented makes the glass for each eye entire, by grinding the upper and lower portions to different focal distances, and thus dispenses with the line which commonly gives to the glasses the appearance of being cracked. It will undoubtedly subserve the purposes for which it is intended, but it will at the same time be a difficult task to grind the lenses in this manner.

Transverse Callipers for measuring the interior of Casks.—A convenient instrument under this name has been patented, two modifications being presented under the application, one of them intended to measure the longer and the other the shorter diameter of the cask. The legs of a pair of common compasses bent about their middle nearly at right angles and crossing each other, will convey a good idea of the form used for measuring the longer diameter, or the distance between the heads. That for measuring the shorter diameter or the swell consists of two sliding arms attached to a rule or scale. These arms are inclined towards each other, making an angle of 45° with the rule, and, of course, a right angle between themselves; and, from the relation of the right angle to the circumscribed half circle, it is obvious that the instrument is philosophically contrived and well suited to its purpose.

CALORIFIC.

Stoves.—An interminable subject of invention and letters patent, is that of stoves, and each year exhibits some new phase, originating perhaps in accident. The current of invention and improvement in stoves and also in furnaces for steam boilers has had lately one principal direction, viz: towards the principle of perfecting combustion by the introduction in various ways of oxygen above the fire. The principle is an old one, and seems to have been most successfully carried out by Mr. Williams of England. In the foreign journals and patents the invention is styled a smoke consumer, and with much propriety, especially in those furnaces where soft coal is used. It is found necessary in all cases to heat the air prior to its introduction above the burning fuel, and the accomplishment of this has been the aim of most of the inventions lately presented. In some, the air is introduced through small apertures in the heated furnace walls, in others through hollow grate bars, in others through tubes passing up the sides within the fire chamber, and in another through a cylinder or casing surrounding the fire chamber. Another device in the management of furnaces for steam boilers upon which much contrivance has been expended, is the introduction of steam either alone or in combination with air, either above or below the fuel, or both. There have been so many modifications of the above principles, with but slight shades of difference, that it would be difficult to select any one as possessed of intrinsic novelty, the construction of the furnaces, or some parts, having been mostly the subjects of the patents.

Hollow Grate.—Rather a novel form of grate has been patented, which was made by surrounding a hollow cylinder, with leaves or flanges of suitable distance apart, and the whole mounted upon an axis to revolve within the fire chamber of a stove or furnace; the hollow cylinder was intended for a heater for air or water.

Ship's Caboose.—A patent has been granted for a ship's caboose, which served the additional purpose of a ventilation for the hold of the ship. The air supplying the combustion is taken from the hold of the vessel, and a ventilating pipe or jacket surrounds the chimney pipe to aid in the operation. The principle has been before used in ventilating dwellings, but its application in this instance involved some novelty.

Parlor Cooking Stove.—A stove of this class has been patented, presenting a convenient, and at the same time highly ornamental stove, and when out of use having no appearance of a cooking stove.

Patent for a Hot Air Register.—This register is designed for use with hot air furnaces. It is placed in the floor of the room as usual, and is moved and regulated readily by pressing the foot upon a wheel or segment which operates the valves or slats.

Patent for heating air by hot water pipes.—The hot water apparatus, as it is termed, is getting into extensive use for heating buildings, but has hitherto experienced a great drawback from leakage occasioned by the expansion of the pipes. The inventor in this case professes to have surmounted this difficulty by a novel arrangement of the pipes, and if so, has made a valuable accession to this article of comfort and luxury. He has a number of parallel ranges of parallel pipes, through which the water circulates in one direction only. Each vertical range has an independent vertical head, and are all connected at the top with one common head, and at the opposite end at the bottom with one common head.

Patent for a Self-igniting Lamp.—A welcome article to the lazy and luxurious. By pulling a string or turning a crank a friction match attached to an arm or wheel is made to rub against sand paper and ignite and moves onward to the wick of a small night lamp. It is to be placed by the bedside or any where in the sleeping room, and is further designed to be moved by clock-work, so as to light the lamp at any given time of night.

Patent for a Self-regulating Damper.—Self regulating stoves have of late been much improved, and are now rendered so certain and reliable in their operation as to command an extensive patronage. The present invention is based upon Regnier's metallic thermometer. When a straight thin metallic bar is bent or raised by the middle, it forms a segmental arc, of which the *versed sine* is twelve times longer than the distance through which the extremity of the bar has moved. Such a bar, if fixed at its extremities, would bend by the action of heat upon it, and the great range of motion thus obtained offers an excellent means of operating the damper or register of the stove, which may be easily connected with or moved by the centre of the bending bar. This is the plan adopted in the self-acting damper before us.

Damper or Valve and Scraper for Stove Pipes.—This patented invention is simple and effective. Two rods take hold on opposite sides of a circular valve or damper in the stove pipe, and by pulling upon one rod and pushing upon the other, the valve can be turned into any desired position, and by pulling and pushing upon both rods, the valve which nearly fits the stove pipe, is carried back and forth and scrapes out the soot.

Patented Portable Lantern.—This invention was at first regarded as impracticable, upon the fact that the model presented being of full size, and designed for actual use, failed to effect the purpose of the invention. The draft usually in lanterns, is from below upwards, and the flame is apt to flicker from the action of currents of air. The inventor in this case, essayed a downward draft, closing the lamp entirely at the bottom, and admitting the air from above. It was also provided with a hollow conical reflector, the flame being under the centre of the cone. The draft being downwards outside of the cone, and upwards through its centre, and regularly converging all round the flame towards the central opening, the flame would be kept steady, and the reflector free from smoke. In the model furnished, the reflector was easily smoked, and the flame was feeble, owing to a want of draft. Another lantern however, was finally furnished which succeeded well, and the patent was accordingly granted.

FINE ARTS.

Musical Instruments.—A patent was granted after much difficulty, for an improvement in the melodeon, consisting in making the sounding board one of the walls of the air chamber or wind chest. A full size instrument was brought to Washington, to exhibit the improvement. It certainly had a superior tone, but I think it questionable whether it was all due to the thing claimed.

A patent has also been granted for an improvement in the sounding board of the piano forte. The inventor employs a sounding case, made of thin boards, perforated on the top of the case, and the case is detached from the frame of the piano forte.

Musical Notation.—Of the many new systems of musical notation, which have been before the office, very few have ever been regarded as anything

ıore than arbitrary selections of signs, innovations and not inventions. A atent has been granted during the year, for a new system of musical nota- on, which is based upon important principles, and has been the source of ıuch excitement in the musical world. This system does away with the gnatures of flats and sharps, and accidentals, and greatly simplifies the :ading of music. Should it answer all its pretensions, it will have much to ɔntend against, before its general adoption. Scholars and masters will have ɔ unlearn, and the vast quantity of printed music now in use, and on the ands of dealers, would be sacrificed. Thus far, I am informed, the most ɛilful musicians cannot bring any serious objection to the system.

New Flute.—A patent has been granted for an improvement in this instru- ıent, of considerable interest to musicians. A and E natural are the poorest ɔtes upon a flute, and cannot be sounded with as much volume as other ɔtes, in consequence of the smaller size of the holes, for the third fingers of ıe right and left hand. The inventor has found, that if these holes be carried ıwer down upon the flute, they can be made larger, and thus give full ɔnes. But in carrying them farther down, the interval would be too great ɔr the spread of the fingers, and to accommodate the flute to this change, he as provided a key for these holes, which is touched by the fingers at the ıme point on the flute, as the former small holes, and thus to the player ıere is no essential change in the mode of fingering.

Patent for an Instrument for forming the touch upon the Piano Forte.— he patentee of the new musical notation, has also taken out a patent for an ıstrument, which may be considered an improvement upon the old chiroplast.

Patent for a Music Stand.—An instrument not readily described, but hose purpose is to turn the leaves of music books by the pressure of the foot pon a treadle. A very ingenious and serviceable invention.

Patent for a machine for Folding Paper.—This curious and quite novel in- rument, folds the paper by passing it between pressure rollers, and works ith great rapidity. It is too complicated to receive more than this passing ɔtice, of its main principle of action.

Patent for a Paper Filer.—A neat contrivance, consisting of a tin box ith a hinged cover folding over its end, and part of one of the sides for se- uring the papers, and an open space on two sides of the cover, allowing an asy inspection, withdrawal and insertion of the papers.

Patent for a Daguerreotype Case.—An invention of a lady, consisting of a onical glass case, blackened on the upper half of its inner surface, and ground n its lower half to admit the light necessary for viewing the picture, which s secured in the larger end of the case, the smaller end being provided with magnifying lens, through which the picture is to be examined. In the or- inary examination of these pictures, every one must have observed the diffi- ulty of getting a proper light. The specular reflection of the plate interferes ith the view, and it is necessary to admit the light to the plate laterally, nd hold over it some dark or absorbing surfaces. Persons wearing dark lresses can generally obtain a good position, without much trouble. This in- onvenience is obviated by the invention, and as the picture will bear magni- ying with advantage, the lens comes in opportunely for this purpose as well ıs that of closing entirely the glass case, and preserving the picture from dust nd exposure to the air.

Holding Daguerreotype Plates.—Two patents have been granted for inven- ions for holding the plates while polishing. They are both clamps of novel :onstruction, one intended to hold the plate upon a polishing wheel, and the

other for holding it upon the table or bench, while polishing with the buff-stick; both of them apparently good inventions.

Patent for a Branding Tool.—Branding tools are usually heated in the fire preparatory to use, and this operation must be often repeated. The invention removes this necessity, by placing the branding letters at the bottom of a kind of portable furnace for charcoal, attached to a lever or handle for using and moving it about.

Patent for Surfacing Floor Oil Cloth.—This operation has been heretofore conducted by hand, with great labor and expense. By this invention much labor and time are saved, the operation being performed chiefly by machinery. The canvass is stretched upon a proper frame or support, and a series of revolving arms, furnished with pumice stones for polishing, are affixed to a carriage travelling back and forth upon a railway, the whole length of the canvass. A man walks back and forth with the carriage, turning the crank for revolving the rubbers, and thus will finish as much cloth in one day, as could be done by three or four men in the old way.

Patent for a method of stretching Painters' Canvass.—An invention apparently so obvious as to excite some wonder that it had never been adopted before. The frame has a mitre joint at the four corners, and the sides are separated for distending the canvass by the insertion of wedges at the joints. It is furnished also at angles, with metallic slides, to keep the sides always at right angles.

Patent for making Dissected Maps for the Instruction of Youth.—These maps are generally made up of pieces of wood cut from a thin board, and have always been liable to warp so as to spoil the figure of the map, when made up. The inventor in this case cuts the pieces in the direction of the grain of the wood, from blocks previously prepared for the purpose. The paper upon which the map is already printed, is glued to the block of wood before it is cut, and by means of suitable dies, the sections are cut out with ease and accuracy, there being as many dies as sections.

SURGERY.

Distending Pessary.—A novel instrument of this sort has been patented, in which an India rubber pessary was used, and distended with air after its insertion, by means of an India rubber bag attached to it by means of a stem. It is also applicable to stopping hemorrhage from the uterus, rectum and other organs.

Patented Lung Protector.—A simple and ingenious instrument, to be placed over the mouth and nostrils, having two valves, one for inspiration and the other for expiration. The induction or inspiring valve may admit air through a sponge or heater, and the eduction valve opens to the air. One valve is operated by one nostril, and the other by the other, so that the air which has been breathed does not pass through the chamber which admits it, as it does in the common respirators.

Milk Exhauster or Instrument for Milking Cows.—A curious device to save labor. Mechanical means have been before used to draw milk from cows in cases where there was an accidental or natural obstruction, but this invention is to milk cows by the wholesale. It will probably answer well in many cases where the cow will submit to its use. It consists merely of a probe and canula attached to a sac of India rubber or gutta percha. The canula or tube of silver is inserted into the teat, being led by a probe which projects through

it, and when the tube is far enough, the probe is withdrawn, and the milk flows in a continual stream. The sac is made like a glove finger, and is tied around the upper part of the teat, serving to hold the canula in place, and keep the teat warm, which is supposed to be an object.

Some isolated cases not regularly included in my classes, have passed under my hands during the year. Among them is a patent for a *method of making soda water*. When soda water is made from the powders, it is difficult to drink it all before the effervescence subsides. The improvement consists in providing a little cage of silver wire gauze, which contains the powders, and is dropped into the tumbler of water, when the effervescence will proceed slowly. The powders may be together in one cage, or in separate cages.

Patented Hook and Eye Tape.—The hooks and eyes are put upon tape, ready for use, instead of being sewed upon a card. To effect this, the eyes and hooks are made of a different shape from usual, the eyelets through which the tape passes being made oblong instead of round. The mode of threading them upon the tape, does not of course need explanation.

Patented mode of attaching Hooks and Eyes to Cards.—An invention of some importance to the manafacturers, inasmuch as we are told the mere operation of stitching hooks and eyes to cards, is to one establishment altogether an expense of ten thousand a year. In this case the hooks and eyes are not sewed to the cards, but the hooks are passed through two openings in the card, and the eye hung to it. The card is slightly crimped between the two openings, so that the eye cannot drop off. It saves an immense deal of time and labor, and is much more convenient to the consumer; for a single hook and eye can be taken off by itself without disturbing others, which is not the case with the old plan, where cutting the string to one, loosens the whole.

Atmospheric Churns.—The subject of churns belongs to the class of agriculture, which class will be reported upon by the Examiner having that branch in charge. In consequence of an unequal apportionment in the number of cases, I have had during the year 49 applications transferred to my desk, and among them 21 applications for churns. Most of these were styled atmospheric churns, and since I have been in the Patent Office I have never witnessed such a *mania* upon any one invention. The first impulse seems to have been given by the grant of a patent for a churn in which there were boxes upon opposite sides of a common revolving dasher, so situated that as the dasher revolved, the box containing the cream, with its open mouth downwards, carried down a portion of air to the bottom of the churn and as the mouth of the box inclined upwards, the air escaped from it through the mass of the cream, while the box itself filled with the cream, and as it came out and revolved in the upper part of the churn above the cream, that contained in the box was thrown out and scattered into spray. Both the descent and size of the box occasioned a commingling of the air and cream, and answered the purpose of agitation as well perhaps as any form of dasher. In the report of last year the rationale of atmospheric churns was given. It may be well to repeat that the introduction of air plays no chemical part in the production of butter, its separation from cream being merely a mechanical process. And although the atmospheric churns operate to a considerable advantage, yet it is by means of more thorough agitation, which is increased greatly by the diffusion of air throughout the cream. As each portion of air rises through the cream it forms a bubble upon the surface before it escapes, and in some of the atmospheric churns where the dasher is constantly submerged, the whole mass of cream is converted into a complete mass of foam.

From the success of such a churn as that above named in producing butter in a shorter time than other churns, a most enthusiastic speculation was at once commenced upon atmospheric churns, and inventive powers were racked to modify, mystify and contort a simple principle, with a view of producing novelties rather than improvements. From the immense number of churns used throughout the country great gains could not fail to follow the monopoly of a new and superior churn. The golden prospects have tempted many into the field, and it is quite curious to observe in this instance the natural drift of intellect, bringing the workings of independent minds into one common channel. A patent was granted for one species of atmospheric churn, but before this could have been known far beyond the walls of the Patent Office, two other inventors, each and all from different parts of the country, had laid claim to the identical improvement. One was from Ohio, the second from Illinois, and the third from Vermont. An interference was accordingly declared, and no sooner had the decision been made in favor of the patentee than three other inventors were found pressing their claims to the same invention. It presents an unprecedented case in the history of the Patent Office of seven persons, each a *bona fide* inventor, all claiming the same thing and about the same time, and all from distant portions of the country. This improvement consists simply in boring a hole through the entire length of a common upright churn dasher, and placing a valve either at the bottom or top of the dasher. This valve opens downwards, and when the dasher is raised with such rapidity that the cream cannot follow up, the air rushes down through the valve under the dasher, and upon the downward stroke the air is pressed out laterally and escapes by the side of the dasher and up through the mass of cream. It requires not a very quick motion and but little force to effect this, and the agitation is most complete. A full size model was exhibited in the office showing the operation with clear water only. Upon agitating the dasher, the water appeared as if in intense ebulition. Another peculiarity belongs to this churn worthy of note. In the common churn the dasher has to be raised out of the cream at each stroke and plunged down with some force, and as this scatters the cream, it is necessary to cover the churn tightly and allow the dasher to play through a small hole in the centre of the cover; but in this atmospheric churn the dasher is kept always under the surface of the liquid, and consequently there is no splashing of the cream, and the cover may be left off with safety, and enable you to watch the operation. A strong recommendation is its simplicity, and as one of the inventors stated he could alter any common churn dasher to this principle for twenty-five cents.

Prior to this simple device for introducing air, several complicated inventions had been patented, and many more made and presented to the office to effect the same purpose. In truth this invention at first was not considered patentable, but after the exhibition of its actual operation by one of the inventors, a different view was adopted and a patent ordered to issue. As atmospheric churns were not new, the ground was taken that the use of any known means of introducing air was not patentable. The ground of action is correct in itself, but did not appear applicable in the case after a personal explanation from the inventor, and an exhibition of the operation and result of his invention. The patentability of an invention frequently turns upon a nice point, and inventions the most novel are sometimes the most worthless, while again others least novel in appearance, bearing the similitude of common and unpatentable devices, are most valuable and important in practice.

Simplicity is the essence of true invention, and it is often interesting to see after a multitude of complicated inventions to attain a certain end, some discerning, or perhaps fortunate inventor, demolish a whole labyrinth of combinations, and arrive at the result by means so simple as almost to rob invention of its charms. Such means as one would suppose should have been the first and not the last resort. Mingled with the surprise are often times feelings of regret and chagrin by his competitors, that they had not discovered this most obvious path. To such cases the words of Milton are quite apropos:

> "The invention all admired, and each how he
> To be the inventor missed; so easy it seemed,
> Once found, which yet unfound, most would have deemed
> Impossible!"

Such cases are the most embarrassing to your examiners. If measured by the length and breadth of novelty, little is to be found, while yet the measure of utility has in no way been made to appear. But to return to the churns.

A modification of the last named churn has been patented, in which the hole in the dasher at the lower part was large enough to contain a solid plunger, fitting loosely within the dasher, which acts the part of a second valve. There have been also several patents granted for ingenious forms of rotary atmospheric churns. These inventors crowded upon the office so numerously, that they were examined with the most rigid scrutiny, and on several occasions, actual demonstrations by experiment of making butter, was required of the applicants, to satisfy the office that the inventions claimed justified their pretensions to be real improvements. In most of these cases, the results were unfavorable to the inventor; but in some, patents were ordered to issue. On one occasion an experiment was performed (humorously characterized by a bystander as a "churn race,") between a patented and a new churn, in which they both came out alike, making butter from new milk in two minutes and a half. Such a rapid separation of the butter, however, is by no means desirable, although this is the general aim of these improvements. We have it upon the highest chemical authority, that butter made so rapidly is not likely to be so good as that which is made slowly.

The above is a brief view of such patented inventions as have seemed to me to be notable among the many referred to me for examination during the past year.

Respectfully submitted,

CHAS. G. PAGE, *Examiner.*

PATENT OFFICE, December 31, 1849.

SIR:—I have the honor to submit to you the following report of the progress and condition of business at my desk for the current year, and of the improvements which have been developed at this office, in the classes under my charge. It has not only been my duty to examine such applications as have been referred to me during the year, but also a large number of cases, which, in consequence of previous inadequacy of force, had accumulated upon my desk.

At the commencement of this year, there were 175 applications awaiting my action; of these, upwards of twenty were transferred to one of my colleagues, and the number of cases referred to my desk during the year is about 512. The number of applications therefore, whose examination has devolved upon me, is about 666; and these have all received from me the examination and actions appropriate to them. This I believe is a larger number of cases than was ever before examined by one examiner in the same length of time.

The number of applications passed at my desk for patents, is about 270; and the number of rejections is about 460; making in all 730; whereas, the number of patents and rejections at my desk, while occupied by my predecessor, at no time exceeded 425 in one year, and it is believed that this number was universally admitted to be all that any examiner ought to be expected to make. You will, therefore, readily perceive that the accomplishment of so much labor, has required the most intense and unremitting exertions, "in season and out of season," during the whole year, and such as few men can continue for a series of years, without a sacrifice of all recreation, and ultimate destruction of health and mental energies.

The number of applications filed in this office during the present year, exceed that of any preceding year by nearly 300, and the current business of the office, without further increase, will severely tax the energies of the present examining force; and should the business increase as rapidly during the year 1850, as it has during the year 1849, it is very doubtful whether it will be in the power of the present force to keep up with it. It will be impossible for the examining corps to labor as they have done for the past year—a little relaxation is indispensable.

In stating that the number of rejections at my desk is 460, I do not intend to be understood that so many applications have been finally rejected. Many applications, after one set of claims have been rejected, are amended, and returned for a new examination, upon new or amended claims, requiring the same labor on the part of the examiner, as new applications, and are reported as such. Thus, one application may be *several* times rejected, and each rejection is reported. The whole number of applications finally rejected at my desk, probably does not exceed 400; and repeated rejections of the same applications, in modified forms, swell the number of reported rejections to 460, which is a fair index of the amount of labor required to dispose of about 400 cases.

It will be perceived, that the number of patents compared with the number of applications rejected, is as three to four nearly. I have had occasion to remark in previous reports, that the number of patents cannot increase in proportion to the number of applications. The field of invention in many of its departments is limited; and every year must necessarily circumscribe it still more narrowly, leaving little to be invented except what has been invented previously. Although many inventors are familiar with what has been done

in those branches of the arts to which their attention has been directed, yet the number of those not thus informed, is very great; and as the field becomes more and more occupied, this latter class can do little else than re-invent what has previously been known, and their exertion and sacrifices must finally end in bitter disappointment.

The spirit of invention, although laudable in the highest degree, appears to be stimulated, in many cases, beyond a healthy action, and many are wasting their time and substance in attempts to improve branches of the arts with which, in their full extent, they are unfamiliar, and in so doing produce what has long since been exploded, or is already in extensive use. As many patentees have been eminently successful, and as a happy hit has sometimes brought wealth and distinction, multitudes are induced to follow the example of their inventive predecessors, and ultimately find themselves less fortunate, if not less capable, than those whom they have attempted to rival. The evils arising from a want of information, can never be in any considerable degree removed. Something can and should be done for the dissemination of knowledge; but knowledge sufficiently comprehensive and minute, to guard against the reproduction of things old, and to guide uniformly, or generally, to that which is new and useful, has never been possessed by inventors, as a class, and never can be possessed, except by comparatively few. The subject is too vast to be generally understood, and if every village in the country were provided with a good artistic library, still multitudes of applications for patents would yearly flow into this office, presenting no approach to novelty. It is not that this most useful class of men are unwilling to labor and investigate; it is not that they are deficient in capacity; but, I repeat, the difficulty is incident to, and inseparable from the vastness and variety of the subject. The poor inventor has not *time* to make the requisite investigations, and when he has made an improvement which appears to him new and useful, it would be much more economical to apply at once for a patent, than attempt to explore the almost boundless and ill-arranged masses of information to be found in the books, the shops, and in the archives of the patent office. As well might it be expected that farmers, mechanics, and merchants *generally*, should become sufficiently acquainted with law to master every legal question which arises among them, as that inventors could command the time to amass all the information necessary for their guidance among the shoals and quicksands which surround them. I speak with the confidence of experience, when I say, that a good knowledge of law is much the most easily acquired of the two, and does not demand that knowledge of foreign languages which is nearly indispensable to the successful study of the arts. Law libraries are very common, but there are few lawyers except those who devote their lives to the science; and a similar fact has ever been, and ever will be observable in matters connected with a knowledge of the condition and history of the useful arts. As I have remarked, something may be done for the spread of knowledge; but after all, the inventor, as time passes on, however warily he may select his paths, will more and more frequently find himself treading in the footsteps of his predecessors. Plants cluster about our paths, and flowers bloom; yet there are few botanists. The stars blaze above us, and the planets fulfil their orbits in the sight of all, yet there are few astronomers; and in like manner machinery performs its wondrous office, but there are few mechanicians; and the attempt to condense mechanical knowledge within such limits as to be conveniently reached by all, would be like an effort to receive and compress the waters of the Mississippi in a demijohn. The difficulties which now exist

are incident to the vast compass of the subject, and they will increase with the progress of time, and no human effort can diminish them. He who acquires a knowledge of these subjects, will do it by years of severe study, under any system that can be devised—an amount of labor not to be expected; and the number of rejected applications must therefore increase, and the number of patents diminish. But one appeal has been taken from decisions made at my desk since 1846, and that one has recently been dismissed by his *honor* the Chief Justice of the District.

The classes under my charge are the following, viz:—Mills, comprehending all kinds of machinery for grinding and crushing, horse powers, regulators and mechanical movements generally.

Land conveyance, comprehending all kinds of vehicles and implements of of travel, and transportation by land.

Machinery for working in lumber, comprehending saw-mills, planing machines, stave machinery, shingle machinery, boring and mortising machines, and the various implements and tools used therein.

Hydraulics and pneumatics, comprehending water wheels, wind mills, machinery for raising water, fire engines, filters, hydraulic engines, &c.

Manufacture of fibrous and textile fabrics, comprehending hemp brakes, cotton gins, wool pickers, carding machines, wool combers, spinning machines, looms, cloth dressing machines, &c., &c.

These several classes, in so far as improvements in them have been developed before me, I shall review as concisely as possible; the constant influx of business leaving me no leisure to extend my remarks.

MILLS.

Twenty-four patents have been granted within the year, for inventions in this class. Until somewhat lately the idea seems to have very generally prevailed, that the products of grinding were in danger of passing too rapidly from between the stones, thereby failing to become sufficiently ground; and various devices have from time to time been invented, to prevent burning the flour without hurrying it through the mill. A different notion however, has within a few years past begun to prevail, and it is believed to have been successfully reduced to practice: Air has long since been introduced between the mill stones for the purpose of cooling them; but the modification above alluded to, is the introduction of a powerful artificial blast, at the eye of the stone, in such manner as to force the flour, &c., much more rapidly through the mill than formerly. It is said that upon this plan, the grinding is perfect, and much more rapid, and that the flour does not remain long enough between the stones to be burned, and that even a hot blast may be used to advantage. Patents were granted in Europe and this country, for this discovery a few years since, and letters patent have been granted this year, for improvements in this variety of mill. The stones have been dressed in such a manner, as the patentee thinks will make them act more advantageously in connection with the blast, to wit:—the furrows in them extending but a short distance from the eye, and the remainder of the grinding surface is left smooth; fixtures are also buried with the eye, the better to keep it closed, and for the better regulation and distribution of the feed.

Letters patent have also been granted for a mill, having three cylinders with smooth surfaces working together, and having alternate reciprocating motions, and hollow axes to admit air within the cylinders, to prevent heating.

Letters patent have likewise been granted for an ingenious mode of forming and balancing millstones, which cannot well be understood without drawings.

A patent has been granted for a compact combination of a mill, with a bran duster upon the same shaft, and capable of convenient and separate adjustment.

The subject of bran dusting has received more attention than usual during the present year, and several patents have been granted for improvements in machinery made for that purpose. It is found that sufficient is saved by the process to justify the construction of nice bran dusters, and improvements in them are eagerly sought for. They are generally applied after the principal portion of flour has been separated from the bran by the bolt, (though sometimes used in immediate connection with the mill,) and their office is to separate that portion of the flour, which adheres somewhat closely to the bran, and discharge it into a proper reservoir. Of course they therefore generally consist of finely perforated surfaces, with brushes or similar appliances between which the bran is rubbed or scoured, the flour passing through the fine perforations. Various devices, generally fans, are used to produce a current of air, for causing the flour to pass through the perforations. It will readily be perceived that the machines are very simple in their nature, and susceptible of but few improvements, and that these must consist principally in slight differences of arrangement of the parts, and changes of form, for the purpose of exposing greater surface with the requisite compactness, and facilities for circulating the air, to carry out the fine particles.

In some of these machines, the air is made to pass through the mass of bran during the rubbing operation, the more entirely to effect the separation, and the perforated surfaces are confined to the lower end, or that part of the machine where the flour passes out. In one of these machines, patented within the year, two discs are used, having conical teeth corrugations working into each other between which the bran is carried, by a current of air. These discs are placed in a horizontal position, and one or two of the corrugations rising from the lower disc, are perforated to allow the flour, while the mass is agitated by the teeth, and carried up over the corrugation, to pass through with the air, which escapes through the perforations. Around the whole there is a gauze cylinder, through which the flour passes, with openings in it for the discharge. The wings are so arranged as to cause a portion of the current of air to pass through the perforations in the projections, from the disc carrying the flour with it, while the rest of the air passing up over the projection, carries the bran forward and discharges it. This machine seems at once compact and effective; and slight improvements in such machinery produce important savings.

But it is unnecessary for me to enter into a particular description of these machines, which cannot greatly differ from each other in principle. Patents upon such machines are liberally granted, because slight changes in them, which would be of no importance in machinery generally, often produce marked results, and require contrivance, instead of mere mechanical skill, to produce them.

Letters patent have been granted within the year, for improvements in flouring, consisting rather in change of process than improvement in machinery. The idea of the patentee, is that sufficient grinding to properly pulverize the glutinous part of the wheat, which adheres directly to the hull, is greater than the starchy part will bear without injury, and that the flour is materially impaired by losing any considerable portion of the glutin. His object therefore,

is to use such a process as will preserve the glutinous matter in the flour, at the same time protecting the starchy parts from an injurious degree of grinding.

To effect this object the patentee uses two mills and two sets of bolting apparatus. The first grinding is usually light, simply sufficient for the softer parts. The products of this grinding are bolted in the usual way; the bran is then passed immediately to the auxiliary mill, where it is subjected to severe grinding, at a very high speed of the runner, which effectually grinds the hard matter adhering to the hull. The products of this grinding are carried immediately to an auxiliary bolt, where the remainder of the flour is separated from the offal or bran. The flour of the various qualities obtained by this last bolting process is immediately returned to the cooler, or to the first bolt, and is bolted with the products of the first mill. The different matters of which the wheat is composed are ground in a manner adapted to them, and the whole of the flour is finally bolted together and properly mingled.

Some other improvements in flouring have been patented, but it is unnecessary to give a particular account of them. They are generally slight, and not of a radical character.

Horse Powers also belong to this class, and two or three patents have been granted for improvements in them. Any one who will consider the field to which inventors of horse powers are limited, and the great number of those who have exercised their ingenuity upon the subject — the many inventions, or alleged inventions, and the few points of real improvements which can even be aimed at — will not be surprised that there are but few patents granted for horse powers, and that the inventions patented are for small improvements.

One of the patents above mentioned is for an improved arrangement of gearing, for the purpose of increasing speed and giving steadiness in a compact manner. I could not give a clear idea of the arrangement of parts without drawings. Another is for arrangement of springs upon the cog wheels, which will compensate for slight irregularities of their form, and will relieve them also in cases of sudden jerks, which might endanger the machinery. Devices somewhat similar, and for similar purposes, have already been used, and there was but little novelty presented. Another patent was granted for an improvement in constructing and uniting the parts of very large master wheels for horse power, for the purpose of obtaining the requisite speed, with little gearing, and consequent avoidance of friction. There is very little patentable novelty in the wheel, but it seems very useful in this kind of horse power.

Two beautiful improvements in hanging mill shafts have been patented within the year, combining great simplicity of construction with very perfect adjustability and neatness.

Having devoted all the time to the examination of this which I can command, and perhaps all that the subject demands, I will hasten to the next, which is—

LAND CONVEYANCE.

Thirty-seven patents have been granted for improvements belonging to this class, comprehending wheels and axles—springs, comprising brakes, &c. &c.

Two or three patents have been granted for improvements in dumping carriages, or vehicles whose bodies tilt for the purpose of discharging their loads. Many carriages and carts of this class have long been known, and there is very little novelty in what has recently been done. One of the cars is so constructed that the body slides backward on friction rollers, and is tilted in that direction. The friction rollers are arranged in levers, so that when it is desired to move the car body they can be so raised as to support the body; but when it is at rest the rollers sink into the mortises and the body is firm. Another of the cars discharges its load at the sides. The body is composed of two distinct parts, which rest on sectors, with teeth and hooks, so that when either part is tilted it is carried towards the side, and continues sufficiently elevated to clear the wheels.

Three or four patents have been granted for car couplings. One of these is intended for a buffer also. The ends of the rods from each car clasp a cylindrical block, to which the link is connected in such a manner as to form a joint. The link is at liberty to move vertically with the block, thus allowing another motion to the connecting parts. Eccentric bolts are put through the connecting rods and links, and these bolts have their ends connected in such a manner that the buffers can be pressed as closely to the cylindrical block as may be desired for the joint. In another of these couplings, the link, in connecting the cars, acts against spring guides, which, except when the cars are coupled, hold the bolts up out of action. The link presses against the spring guide, which retires before it until the link comes into position, when the bolt passes through the link and the cars are coupled.

Another self-coupling apparatus, which I will notice, consists of two spring hooks, jointed to the coupling bars or rods by pins passed through the end opposite the hook ends, and a little back of the ends of the bars. At the ends of the coupling bars there are cross bars or catches to receive the hook. As the cars approach each other the hooks or catches both slide over these bars and catch each to the opposite car. Thus the cars are held together by two hooks at once, without a link, and both ends of the cars being armed in the same manner, they are prepared to be coupled by a self-acting apparatus, which ever end may happen to be brought together. Thus the necessity of changing the links, when the cars change ends, before the cars can be coupled, is entirely obviated by the most simple device. When the hooks are in action they are held down by springs.

Several patents have been granted for improvements in *Carriage Springs*. One of these consists in so crimping or corrugating the flat or elastic spring that it may readily yield to the necessary extent endwise to such shock as may render such yielding necessary. I have not seen these springs in use, but they may answer a good purpose.

An improvement has been patented in spring reaches, which appears to obviate some of the objections heretofore urged. If the springs are arranged in any of the modes heretofore patented, a compromise must be made and one objection must be overcome by introducing another. It seems, however, that by a system of diagonal bracing among the springs—a system differing very little in appearance from what was previously known—the benefit of the springs can be retained while the objections to them are much diminished.

A mode of preventing the lateral and end motion of carriage bodies has also been patented. Braces for this purpose, in ordinary use, become less

tight as the carriage body sinks by weight, or by passing over impediments, and, therefore, do not retain it at all times with the same certainty and steadiness. The patentee connects the sides and ends of the body with the reach near its centre by rods connected with opposite edges of a plate, or its equivalent, playing up the reach like a fifth wheel. As the body moves, therefore, the practical length of the braces will continue nearly the same, and obviate, to a great extent, the objections above mentioned.

An improvement has been patented in hanging car bodies. These springs have before been used in a manner somewhat similar, but in the present instance the tubes for guiding and protecting the springs are made a part of the boxes for the axles,—thus making a neater, more compact, and simple fixture. The springs and spring cases work in pockets in the side rails of the truck frame.

I will notice one other patented spring. It consists of two plates placed parallel to each other, with circular rows of pins placed between them, and supported by them in a position perpendicular to them. Space is left between the plates sufficient for the introduction of India rubber bands of sufficient strength. Each plate is then divided into two equal parts, the separations being opposite to each other. Strips of India rubber are then placed around the different rows of pins. It will be perceived that the frame work, or case of springs, is divided into two parts, and that when the opposite plates are bolted together, each part, by the use of the ears, may be connected in the usual manner, and the spring brought into action. The strips of India rubber should be placed in such a manner as to have different degrees of tension, so that the springs may become stronger and the tension may increase with the weight.

Some eight patents have been granted this year for improvements in iron wheels for cars and carriages. In one of these, the hub is made and the spokes connected with it in the following manner: An external casing, in the form of the hub, is made of sheet metal; an internal tube is then made of the same metal, with flanges at its ends to fit the outer casing, having a space or hollow ring between the outer casing, the tube, and the flanges. Openings are made in the outer casing, and the spokes are inserted with the ends resting against the tube; fused metal is then poured into the hollow space in the hub above mentioned, which cooling, fastens the spokes to the hub.

Another very pretty wheel, especially for carriages, has been patented. This wheel is made in the usual way, except the rim and tire, which are constructed and united as follows: The felloes are made of cast iron ribbed for strength, with swells in the ribs to receive the spokes and bolts. The spokes do not meet the felloes at their joints, but the ends of the felloes are grooved in lines radiating from the centre of the wheel, in such a manner as when the joints are closed, to form a bolt hole through the felloes at each joint. The tire is then put on, and bolts are passed entirely through the tire and the joints of the felloes and secured by nuts. Thus the joints are made and the tire secured by the same bolts.

A wrought iron car-wheel has been patented; the improvement in which consists in the mode of connecting the rim with the inner part of the wheel. The spokes are connected at their outer ends by a band constituting a light rim. This is dovetailed in its cross sections. The principal rim, or tire, is of sufficient strength, with a groove in its interior, to receive the narrow dovetailed rim, which groove is spread sufficiently to receive it without depending

entirely upon expansion in heating. After heating this tire, the rim is inserted and the tire is powerfully forced upon the rim by pressure on the tread as well as upon its sides. Thus the dovetailed joint is formed and tightened without the use of soft fused metal, which gives great strength and durability to the wheel.

Several patents have been granted for alleged improvements in cast iron disc car-wheels. Wheels of cast iron, must, of course, possess the proper forms for wheels, and these forms render it difficult to cast the rim, and chill it, in connection with the rest of the wheel; the unequal contraction causing fracture, or a degree of strain which often renders the wheel useless. Various modifications of form have been adopted to obviate this difficulty with some success, but the world does not yet extend to cast iron wheels their entire confidence. The beneficial results which have followed several apparently unimportant changes of form, have induced this office to be liberal in granting patents for them, in hope that the desired end might finally be attained by means at first appearing unpromising, if not unphilosophical. Wheels with concavo, convex, corrugated and mixed discs, have formerly been patented; some of these being with, and some without spokes, or flanges. It is not necessary to give a detailed description of the precise forms of the wheels patented this year, especially as they are generally but modifications, or combinations of forms already known, and cannot be proved, except by experiment, to be better than the wheels now in use; and I am not aware that such fact has yet been thus established. It may not be amiss, however, to state that one of the cast iron wheels patented this year is composed entirely of tubes opening into each other by trumpet mouths; by which the inventor expects to attain the requisite compensation for contraction in cooling. This wheel differs more in form from those well known, but its advantages must be tested by experiment. There is no merit in a mere change of form, without an improved result, and in ordinary cases, it is an established principle of patent law, that such changes are not the subjects of letters patent, unless the claim to real improvement is at least plausible. But upon applications for patents upon such subjects as the above, this office should be liberal, as great injustice might otherwise be done, from the impossibility of judging *apriori* of the advantages of form. In these wheels, form is every thing that could be patented, and if the desired result can be attained, the successful competitor will richly merit his reward.

Several patents have been granted for improvements in hubs and axles, or their adaptation to and mode of connection with each other. Every improvement which increases safety, or security in this part of vehicles, is of much importance, as upon them safety to life and property more especially depends. As prompt action is also necessary, much is saved by easy modes of removing and re-adjusting the wheels. Letters patent have been granted for a mode of connecting the hub to the axle, where, by the act of raising the axle with the jack, the wheel is released and ready to be removed, and when replaced, and the jack removed, the wheel is again firmly held. This is effected by a spring catch working in a groove in the inner end of the hub, which holds the wheel to its place. From this catch a pin extends down through the axle which rests upon the jack when the axle is raised, and the weight of the vehicle forces up the catch, or releases the hub. Another patent mode of holding the hub upon the axle is as follows: A rod having a hook at one end is laid in a groove upon the top of that part of the axle which enters the hub; so that when the hub is in place the hook end of the rod projects

beyond the washer or shoulder, against which the washer usually rests. The other end of the rod extends beyond the inner end of the hub, and is there bent up, forming a kind of handle. When it is desired to release the wheel, the rod is turned up by this handle, and the hook at the other end moves round and comes directly over the end of the axle, opposing no obstacle to the removal of the wheel. When it is desired to hold the wheel in place, the rod is turned in the other direction, and the hook extends out over the end of the shoulder, at the outer end of the hub, and prevents it from being removed. The outer end of the hub may be closed.

In another improvement, the oil box is connected by springs to the upper part of the box, in such manner as to rise as the soft metal of the box wears, thereby keeping the joints tight, and indicating the wear of the soft metal, or other substance, against which the axle bears. Letters patent have also been granted for an improvement in oil boxes, consisting principally in the arrangement of partitions for the better application of the oil, and disposition of the waste. One of the improvements patented, consist principally in making that part of the axle hollow, which enters the hub, and placing friction wheels within this cavity, upon an axis of its own, which lies a little below the centre of the principal axis. This arrangement it is said, will insure easy running of the wheel, and when the carriage is running upon the horses, the part of the axle which has no anti-friction surface, will press against the boxes, and by creating friction, operate as a brake, and resists the motion of the carriage at the most convenient and advantageous point.

I will simply mention one other patented mode of connecting wheels with axles. It consists of a groove in the axle, into which a sliding spring plate works, which is connected with the hub in such manner as to spring into its place, when the wheel is brought up to its place. When the plate comes into the groove, in position to hold the wheel, a horizontal spring pin, which retires as the plate rises into place, drops into a perforation in the plate, and holds it firmly, so that it cannot be disturbed by such shocks as the vehicle is subject to.

Several brakes for carriages have been patented this year, some of which I will briefly notice. One of these improvements is in the apparatus to hold the block of wood which operates against the wheel. These blocks are liable to wear and become useless, while the holder remains uninjured, and much trouble and damage to the parts are necessary in removing the block, and substituting another. To obviate this, the patentee places the block in a clamp, connected with the arm of the brake, which clamp, has a hinged jaw; and holding these jaws together by screw bolts passing immediately above and below the block, and bracing the upper and lower ends of the block, so that it will not slip out between the bolts. With this arrangement the wooden rubber can be removed, and another substituted almost as easily and conveniently as if they were merely held in a vice. Another patentee connects the brake to the truck frame by a link. This link at each end passes through a box, which is lined with India rubber, making it tight. The elasticity of the India rubber is sufficient to raise the brake from the wheel when not in use, and when it is brought down upon the wheel, the India rubber yields all that is necessary, thus preventing all friction, noise and wear of the parts which would otherwise be disagreeable and injurious.

Another patent which I will notice, is for an ingenious arrangement of levers and connecting rods with brakes for eight wheel cars, whereby the force applied by the brakesman to one set of wheels, re-acts upon the brakes of the

other sets; so that each set receives the power applied, as forcibly as if the other were not used, and nearly the same force is applied. Arrangements having a somewhat similar effect, have heretofore been made; but one excellence of that under consideration, is that they can be with the utmost ease applied to the brakes most commonly in use, without alteration. Two levers are placed between the trucks and their centres united by a rod, and with these directly or indirectly, all the others are united. Further remarks upon brakes or other matters connected with the subject of land conveyance are deemed unnecessary. I will now proceed to the consideration of another class.

HYDRAULICS AND PNEUMATICS.

In this class thirty four patents have been granted, extending to some ten varieties of sub-divisions. A large number of applications belonging to this class are annually made, but all its branches have so long been the subject of investigation throughout the civilized world, that it is difficult to produce any thing essentially new, which is of an interesting or useful character.

Two patents have been granted for improvements in windmills. They present slight novelty, but seem to be no more useful than those in common use. Both wheels revolve upon vertical axes; and there are novelties in the mode of regulating the vanes.

Two filters have been patented. The one consists of a series of boxes filled with proper filtering materials. The water passes through these in succession, always passing upwards, with arrangements for throwing each section occasionally out of action for cleansing, without interrupting the operation. The other is a filtering faucet, so constructed that the water may pass through the filtering medium successively in opposite directions at the pleasure of the user, for the purpose of cleansing; or the water can be drawn directly, without passing through the filtering medium.

Two blowers have been patented. The one is a slight modification of those blowers which consist of spiral arms inclosed in a cylinder, working in a reservoir of water. The other is a kind of compound bellows, having four apartments, the two outer ones communicating directly with the tube, the air being received through the centre partition, and discharged alternately on opposite sides thereof. Alternating motions are given to the bellows through a rod connected with the same partition, whereby a constant current of air is produced.

Two patents have been granted for improvements in the water ram. In one of these the water is conducted to the chamber by small tubes firmly connected, for the purpose it is said, of preventing shocks, and too great a recession of water. The other for an improvement in the waste valve and appurtenance, for the purpose of making it close more suddenly after the pressure has become sufficient.

A patent has also been granted for a valve of water mains. It possesses some novelty, and is cheap and efficient, and easily repaired. A regulator for water wheels has also been patented, whereby the discharge of water from the wheel is regulated to govern its speed. An improper degree of speed is, by a common regulator, made to change the band on cone-pulleys, and this produces a differential motion in gearing, which operates to expand, or contract the discharge.

No less than six patents have been granted for improvements in raising and transferring water in buckets out of wells. A remarkable degree of inventive

genius seems suddenly to have been called into action upon this subject. All these patents have been granted for slight improvements in modes known for centuries. They comprise the means of tilting the buckets, changing the direction of their motions, carrying the water to points somewhat distant after it is raised, &c. A detailed account of them is not necessary, they can be sufficiently well understood if desired, by perusal of the claims.

Eight patents have been granted for improvements in pumps for raising water. One of these is a rotary pump, in which the floats work upon a vertical shaft; each float has its lower part united to the upper, by journals at their ends, in such manner that the pressure of the water will keep the flapping under parts in an upright position, but when they meet with stones or other hard obstruction, they will revolve on their journals and pass over without breaking. In another of these pumps, the casing is an inverted conical frustum, having an inclined way arranged from end to end, and as the floats revolve, the water ascends these inclines to its point of exit.

Another of these rotary pumps is constructed as follows:—The casing is cylindrical with induction and eduction openings; between these openings there is a recess, within which a stop plays. This stop at its inner end is connected with a cylinder of equal length with the interior of the casing, but of less diameter. This inner cylinder is placed upon an eccentric shaft, in such manner that its outer periphery shall at one side touch the casing; as this shaft revolves, the cylinder constantly changes its line of contact with the casings, causing the water behind it to rise, and forcing out that which is before; the stop in the meantime sliding in and out according to the eccentricity of the shaft. A band of India rubber around the cylinder will keep the joints tight, and it will be perceived that the cylinder or piston does not revolve, but is constantly pressed against the casing, scarcely rubbing at all. The pump appears to work admirably.

Another pump which is reciprocating, has its spout so connected with the cylinder that it can be turned so as to discharge on either side. A pump has also been patented whose piston chamber is trumpet mouthed above the point where the piston usually plays. The lower valve is a ball resting in a proper seat, and connected to the piston by a chain of such length as not to be disturbed by the ordinary motions of the piston; but when the piston is raised above the trumpet mouth of the chamber, it also raises the lower valve, so that any water in the body of the pump will fall to the bottom. There are two or three other pumps of sufficient interest to receive notice; but it would be very difficult to give an intelligible description of them without drawings, and they are therefore passed over.

A few patents have been granted this year for improvements in water wheels. Two of these are for tide wheels, one of which is too complicated for a particular description without drawings. It has gates and casings so arranged as to cause the water to descend upon the wheel in the proper direction, whether from one side or the other, and is connected with a regulating apparatus for the supply of the water. The other is placed upon a shaft which is inclined by being eccentrically connected above to a revolving platform whose centre is directly over the stop in which the shaft rests. In this position, it will be perceived that the paddles of only one side of the wheel can dip at the same time, and on which side this shall take place, is readily regulated by revolving the platform.

Letters patent have also been granted for an improvement upon reaction wheels, by which their motion can be readily reversed; and another for a wa-

ter wheel in the form of a conch shell. There is another wheel which I would like to notice for its singularity, but it would be utterly unintelligible without drawings. I regret the less being unable to notice it, as it appears more ingenious than useful. There is nothing further in the class of hydraulics and pneumatics which requires particular notice in this place, and I will therefore dismiss the subject and hasten to the next.

LUMBER.

About ninety patents have been granted within the year, belonging to this comprehensive and diversified class. It has ten subdivisions, many of which might well be again subdivided, besides numerous miscellaneous matters. Much of the machinery of this class is very complicated. I shall proceed to view the various patents belonging to it, as concisely as possible, under the various subdivisions.

Saw Mills.—Some ten patents have been granted this year, belonging to this variety of machinery. Among these is one for sawing wood. The log is placed upon the arms of a revolving feed cylinder, and is raised to the saw. When the sawing of this is completed, another is brought to the saw upon other arms, while the cylinder continues to revolve. Another is for sawing mitres, which is effected by causing circular saws to move towards each other while the board is passing. The motion is governed by guides and regulators to give the desired angle to the kerfs.

An improvement in barrel saws has also been patented. This saw is made in sections, for greater stiffness; the carriage travels upon adjustable inclined ways, in order to carry the block slightly away from the saw as it receives the cut, and a guide travels with the stave as it is cut, within the saw for the purpose of drawing it away from the saw. The object is to avoid contact between the saw and the timber, except at the point where the work is done.

Three patents have been granted for improved machines for curvilinear sawing. One is for a mode of regulating the warp of the kerf, especially for ship timber; the log is to be turned in accordance with the gauge, as the sawing progresses, and the turning of the saw is effected by levers acting with swivels. Another of these mills provides a revolving adjustable platform, which may be elevated and depressed, in order to keep the parts of the log equally above and below the centre of rotation, as the work progresses, and the log is turned. This, it is alleged, will tend to prevent bending and breaking the saw. Another of these mills has arrangements for turning the saw by force applied to the swivels in connection with the saw, near the part where it operates upon the log. The parts are grooved together in such a manner as to act with uniformity, and prevent strain and twisting of the saw.

Some half dozen shingle machines have been patented within the year, but differ so little from such as have been known, that the difference, though patentable, could not interest when pointed out in a cursory manner. One of them, however, I will notice, which is more out of the common course. It is a revolving disc machine, not easily understood, even with drawings, but it effects the cutting, planing and joining of a shingle at each revolution.

Fences and Gates.—Seven or eight patents have been granted in this division of the subject. One of those patented, is a gate for a flood fence. It is made to slide up and down in grooves of posts, and has a float attached at the bottom, of sufficient buoyancy to elevate it as the flood rises, and the weight is sufficient to depress it, after the flood has subsided. Another of

these gates folds up when opened, after the manner of "lazy tongs," within a compass equal to the width of the slats; in opening and closing, it slides upon ways. Another folds upwards, so that the slats which, when it is closed are horizontal, become vertical when open and in juxtaposition with each other. A very simple fence is among the patented, made by winding a wire at points near the tops and bottoms of the palings, around each paling, and carrying the wire on to each in succession, and winding around pins in the posts for support, the palings having shoulders above the lower wire, and below the upper one, to keep them in a vertical position.

Two patents have been granted for machines for cutting veneers. The one cuts them from flat surfaces of wood, and the other in continuous sheets around the convex surface of a cylinder. Both these modes of cutting are well known, and the machines are but improvements upon those formerly used; but it would be impossible without drawings to give a clear idea of the improvements.

Letters patent have also been granted for an improved mode of glueing veneers. The caul, almost universally used, is made of wood, or other hard material, in the reverse form of the surface to be veneered, and a different one is necessarily resorted to for each different surface. The patentee, in the case under consideration, uses a plain caul with a thick facing of India rubber, which is said to adapt itself in a practical manner to almost all surfaces in succession.

Letters patent have been granted for several treenail machines, bench hooks and machines for cutting felloes. A machine for splitting and dressing rattans. A machine for making brooms; some of which could not be rendered intelligible in this place, and others it is not necessary to describe. A very pretty invention has been patented for bending timber, in which pressure is applied to the ends, as well as to the sides. It is said to work admirably, and to obviate most of the difficulties which have heretofore been encountered.

Turning.—About twelve patents have been granted for improvements in lathes, turning irregular forms, cutting wooden screws, &c. Two of these are for turning right and left hand lasts at one operation. Two for improvements in gearing for lathes. Another of these patents is for a machine which turns the toes and heels of the lasts perfectly, and presents a new mode of varying the relative portions of the pattern and the last, or other irregular form turned. In two of the machines mentioned, inverted patterns are used. Two slight improvements have been patented in turning screws on bedstead rails. A machine has been patented for dressing irregular forms, in which the cutters travel lengthwise of the block and patterns, they having an intermediate revolution to adapt them to the motion of the cutters. The foregoing machines for turning, &c., are generally too complicated to justify an attempt to present them in detail, without drawings. However useful they may be, they present very little novelty.

About twelve patents have been granted for boring and mortising machines, most of them of a miscellaneous character; such as boring out bungs for casks, boring spools or bobbins, &c. Two of these patents are for boring hubs, to prepare them for the reception of boxes. Both of these machines present improved modes of holding the cutter, and one of them has an improved apparatus for feeding the cutter forward, to compensate for great resistances. One of these machines is for boring ship timber. The auger is carried forward as the boring proceeds, by a rack and pinion, and whenever it is necessary to clear, an auxiliary pinion is thrown into gear and reverses

the motion. The novelty is in the manner of producing the motions; the same motions being previously effected by machinery. Letters patent have been granted for two or three other mortising machines. One of these produces the mortise by an endless chain of cutters.

Barrel Machinery.—Several patents have been granted within the year for improvements in machines for performing the various operations necessary in the construction of barrels, &c. Four of these are for jointing staves. In one, the stave is jointed by being held on a platform, which vibrates in such manner as to convey the end of the stave towards the cutter or plane, as it advances. The plane used is a double one, with cutters set in such a manner that each cuts its appropriate end of the stave. The radius of vibration of the platform is adjustable for different sizes of casks, and the vibrations are effected by inclined surfaces. In another, the cutters are attached to a horizontal disc, made dishing, and the stave is held in a swinging frame outside of the circumference of the cutter disc. The stave is not bent, but the dishing form of the cutter disc, corresponding with the knives, produces the proper variety of width. In another of these, a double plane is used, like the one just above mentioned, except that the stock is jointed between the cutters; and the requisite angle can be given to the stock to dress both ends of the stave to its required width. Two or three patents have been granted for machinery for planing staves. They have rotary cutters, shaped of course to the form of the stave, with devices for forcing the stave between. These machines have the general character of planing machines, and to point out the nice distinctions between them, would require drawings, and more time than I can devote.

Planing Machines.—The immense importance of this variety of machinery, and the present condition of the planing business, have called into action a vast amount of inventive genius, and directed it with incredible zeal and energy to this department. Above twenty patents have been granted for improvements in planing, and many applications have been rejected. When the true character of machinery for planing is considered, when its simplicity is recollected, and the vast efforts which have for a long time been constantly made to improve and modify this branch of machinery, it will scarcely be believed that all the patents granted this year cover real improvements, in the popular sense of that term, but it will be obvious that many of them are *improvements* only in its legal meaning, to wit: such modifications as are patentable, whether better or worse, than what was previously known. Some of the machines above mentioned appear to have answered a good practical purpose, and the same fact may ultimately be developed in relation to others. It is unnecessary to advise the public particularly in relation to machines which are useless, and it is notorious that all, or nearly all, which are reduced to successful practice, immediately become the subject of litigation, and from that source derive sufficient publicity.

Few, if any, of those to whom patents have been granted this year, have used the convex or cylindrical cutter; but the improvements which have been patented are applied to disc, stationary and reciprocating planes. In all these varieties of machines, improvements have been made which appear to render them successful. Some of them have long been an obsolete idea for planing boards, though some of them have long been known to be useful for planing timber, and for some other purposes. Some experiments have been made with the above mentioned machines, which appear to have proved eminently successful; but whether in course of time they will be found to excel, or suc-

cessfully compete with those which have heretofore been most popular, it is at present, perhaps, impossible to determine.

I am not aware that further remarks upon the subject of planing machines are necessary; the nice distinctions between pre-existing machines and the improvements upon them which have been patented, would lead me beyond appropriate limits.

Having disposed of the inventions in machinery for working in lumber, I now come to my last class.

FIBROUS AND TEXTILE MANUFACTURES AND MACHINERY.

About ninety patents have been granted this year for improvements comprehended in this class. Machinery for the manufacture of fibrous and textile fabrics, is more complicated and multifarious than that of any other class, and the vast number of improvements already made and published in the books, used in the factories without publication, and to be found in the archives of this office, and elsewhere, render the field of investigation almost boundless, and the number of improvements of which it is susceptible, will continue to expand its limits with increasing rapidity. The subject is inexhaustible, and each new discovery but prepares the way for others still more subtle and refined. I will commence the review of this class with machinery connected with the preparation of the various kinds of fibres used in this branch of manufactures.

Two or three patents have been granted for improvements in wool-pickers, or burring machines. One of these is for an improvement in burring cylinders. The patentee winds narrow strips of sheet metal, at short distances apart, around a cylinder; one edge of these strips being placed in grooves in the surface thereof. Hooks are formed in each alternate ring, and the intermediate rings are left without teeth. This arrangement, it is contended, gives a better opportunity for saving the fibres, and more effectually excludes the burrs and other substances which are to be beaten off while the fibres are held.

A mode or process of constructing burring and other toothed cylinders has been patented. It is as follows:—A thin threaded screw, of the size required for the cylinder, has wound around it a covering of thick paper, or paste-board. The spaces between the threads would thus form a spiral tube. Through the paste-board, and into these grooves, teeth are inserted, so that their ends will rest upon the bottoms of the grooves. The screw, it will be perceived, thus guides in inserting the teeth. The screw is then taken out by turning it, the ends of the teeth forming the thread of a female screw. A cylinder is then inserted in the place of the screw, and fused metal is poured in between this cylinder and the paste-board, and allowed to cool. The paste-board is then removed, leaving the teeth properly set.

Five or six patents have been granted for hemp-brakes and scutchers. In one of these the hemp passes from the feeding apron to pressing rollers, grooved around their circumference, thence between beaters or knives, both sets of which strike the hemp, and while the hemp is held between the beaters, and also between the grooved rollers, scrapers on both sides come upon it with a compound sliding and crank motion, which causes them to move nearly in a flat eclipse, and thus keeps them long in contact with the hemp between. In another of these machines, the hemp passes first between smooth weighted rollers, then between rollers grooved lengthwise, and thence between

beaters, both of which move; the beaters having sets of small rollers, or cleaners, revolving between them to carry the hemp forward, and prevent it from hanging between the beaters.

One of the scutchers patented has a large disc, to the face of which the swords are attached in a position tangential to a large hub, or head; the swords being inclined to the face of the disc in an angle of thirty or forty degrees. A rest of course is provided to support the hemp during the operation. The foregoing machines are all said to work admirably.

Four or five cotton gins have been patented this year. One of them has an auxiliary grate placed in a position nearly horizontal behind the common grate, and bent in such manner that the teeth of the saws pass twice through. Immediately back of the point where the saws pass the second time through the auxiliary grate, there is a revolving brush to remove the dust and impurities which are deposited. In another of these gins the ordinary grate is dispensed with, and a screw roller is substituted, of such form as would be produced by winding wire around a cylinder, the coils touching each other. The saw teeth are such as would be produced by making incisions with the edge of a flat file into the edges of a circular plate, leaving the spaces between untouched. By this machine the bolls are kept moving from one side of the gin towards the other, coming successively in contact with different teeth until the cotton is entirely stript off, and the seed falls out at the end of the machine. Two patents have been granted for roller-gins, but I could not make them intelligible without drawings.

Six or seven patents have been granted for improvements in carding machines. In one of these, the workers and clearers are driven directly by a band from the shaft of the main cylinder. The other has reference to a mode of stripping the cards. Instead of using the well known flat top cards, cylinder cards are substituted for them. The cylinders have not the usual motion of top cylinders, but they are intended to be almost stationary for the main cylinder to work against, and to carry off the impurities. Upon these cylinders there is a frame containing one stripper for each, and as they revolve very slowly, they are stripped by the vibrating motion thereof.

Sewing Machines.—Machines of this kind, until within a few years, have attracted but little attention; but as they are coming into use, and are found to answer an excellent purpose, the inventor is ingeniously exercising his skill to improve them. No less than five patents have been granted this year for sewing machines. One of these is a re-issue of a patent granted some years ago, and need not be noticed. Two of the others are much alike, differing only in minor particulars. The cloth in each with its edge properly presented to the needle, is secured to a proper feeding apparatus. The needle is placed perpendicular to the cloth in a frame sliding back and forth for inserting and withdrawing it; the eye is near the point. On the opposite side of the cloth is a twisted hook which slides endwise in a direction nearly perpendicular to the needle; as the needle passes through, the thread is caught by the hook and drawn sidewise, forming a loop. When the needle again passes through the cloth, it passes through this loop also, and the hook moves forward releasing the old loop, and seizing the new thread, forms a new loop passing through the old one. This operation combined produces what is well known as the Tambour stitch.

In another of these machines, the thread is carried through the cloth by a bent needle, with the eye near the point. The shape of the needle leaves a space between it and the thread. A shuttle upon a circular way on the side

of the cloth opposite the needle has in it a bobbin of thread. This shuttle is sharp pointed and curved to adapt it to the way, and as it moves around it passes through the opening between the needle and the thread, and the needle is then withdrawn, leaving a loop of its own thread around the thread of the bobbin. This, if continued, will produce a seam. The shuttle is driven by two arms from the centre shaft with pins in their ends taking into perforations one in each end of the shuttle, and whenever one of these pins approaches the thread of the needle it is raised out of the way, and the shuttle is driven by the other. There are other ingenious devices connected with the machines which I would gladly describe, but I am unable to devote further time to them.

Six or eight patents have been granted for improvements in machines for making cordage. One of these is for an ingenious, but rather complicated apparatus for regulating the tension of the yarns. It could not be made intelligible in this place. Two of the others are intended for making ropes from cotton. The improvements in the nipper, by which, as the strands pass through them, any impurities which may stick to the sides of the strand are removed and thrown out, and in placing in the forming tube at the point where the strands meet and commence laying, a block, or plate, having a perforation equal to the size of the rope. This block being able to move laterally to accommodate irregularity of strain. The springs which press together the jaws of the nippers have also been improved. In another of these machines the strands are conducted as near to the laying point as possible; each in a direction tangential to an imaginary core of the rope as nearly as possible in the direction in which the strand is to be laid.

In the last I will notice of these machines several sets of bobbins are arranged about their respective spindles. The threads pass through perforations in a flanch, firmly connected with this spindle; thence they all pass through a single opening in the top of the spindle. The threads or yarns from the bobbins arranged around each spindle and form a strand. These strands are guided up to the top of the main shaft, when they pass through their respective openings in said shaft to the nippers. The whole receive a sun and planet motion, producing on all parts the proper twist; and the cord is drawn off in the usual manner. The spindles receive their motions from the interior of a fixed ring against which pullies, or wheels, on the bottom of the spindles work; the motion being produced by friction. The upper side of the fixed ring is bevelled, and the lower edges of the spindle pullies are bevelled also, and these last are susceptible of adjustment towards, or from the main shaft. This construction and adjustment enables the operator to adjust the relative speeds of the various parts at pleasure, and secures great steadiness of motion.

A very interesting lapping machine has been patented this year, whose details cannot easily be presented without drawings. It has guides so arranged that whether the number of laps is greater or less, each at once assumes its appropriate position upon the roller. Two very ingenious machines have been patented for twisting the fringe of shawls. They are totally different from each other, but both seem calculated to perform their duty very perfectly and with great expedition.

Two machines have been patented for making weavers' heddles; the one of wire, and the other of thread. The one draws the wire into the machine, cuts off the proper length, doubles it in the proper manner, while the twist is given to it, which completes the heddle.

The other is a kind of loom, using shuttles. It is quite complicated, as may easily be supposed from the duty it performs, and difficult even to understand with drawings. It seems effectually to perform its work.

Spinning.—Some fifteen or twenty patents have been granted this year, for improvements in machinery for spinning. Two of these are for improvements in the self action of mules, and self acting jack spinners, of which it is of course useless to attempt an intelligible description without drawings. Another is for a machine for producing yarn of the same kind as that spun on the mule, retaining the spindles always in the same relative position to the draw rollers. This is said to be accomplished, and perhaps it may be so, however incredible it may appear. A new mode of gearing drawing heads, has also been patented. An improved flier has been patented, whose arms in their whole length are thin hollow tubes, made of steel, and said to answer well, and to be a great improvement. An improved apparatus has been patented for spinning rope yarn, in which the flier has heavy discs at both ends, and in which the drag is produced, and regulated by a forked bar or spring pressing on a washer, resting on a shoulder upon the spindle, the fork embracing the spindle and the pressure being adjusted by a set screw, thus producing the necessary drag by pressing the spindle down evenly into its cup. This arrangement is said to produce a steadiness and efficiency heretofore unknown in this department of spinning.

In some spinning machines, the bobbin rests its weight directly upon the circumference of a wheel. The wheel has such a position as to drive the bobbin when in motion. It has been found however, that when driven in this manner, the bobbin is by little irregularities frequently thrown up, producing much mischief, in a process so delicate as spinning. To prevent this, a collar has been interposed between the bobbin and the wheel, which drives it. This collar is held down by a collar over the spindle. By this arrangement these injurious irregularities are prevented from extending themselves to the bobbin. An improvement in spindles has also been patented to foreigners; but this improvement has been published in the English journals, and need not therefore, be described.

Looms.—About thirty patents have been granted this year for improvements in looms for weaving. Seven or eight of which however, are re-issues, and have been previously noticed. Machinery of this kind is generally so complicated as to render futile any attempt to describe them without drawings, or within such limits as would be justifiable in this report. Some of the improvements however, I will notice; for the rest, I must necessarily refer to the records of this office, or to the patents themselves.

Some years since, patents were granted for two or more looms, in which the shuttle-boxes were worked by a wheel, with two rows of pins in its disc, through the medium of chains, hooks, weights, &c., which machinery was rather complicated. Within the year, a patent has been granted for a loom, in which the pin wheel is used for the same purpose, but by very different and simple means. The spear or rod which moves the shuttle-boxes, has a shoe affixed to its lower end, with several inclined planes of different lengths. The pins in the wheels are also of different lengths, and their position is changed at pleasure; certain of the pins only will reach the different inclines. These pins by working directly against the inclines on the shoe, elevate the boxes. They will of course fall when relieved by their own weight. They may be worked for different patterns by merely changing the pins. This arrangement raises the boxes only the space of one box at a time. A subsequent patentee

arranges several rows of pins on the pin wheel in lines, at once concentric with the wheel and radiating from the centre. He uses a single shoe, and the pins are all of the same length; the lower side of the shoe is an inclined plane. As the wheel revolves, the pins striking against the incline of the shoe, will raise the shuttle boxes. By this arrangement the boxes may be so operated, that the highest and the lowest, or any other two may be used in succession. This will answer for an ordinary number of boxes; but would probably fail if six or eight shuttle-boxes should be used. Another patent has been granted for a loom, having the pin wheel with one row of pins of different lengths, which is capable of greater compass. It is however much more complicated.

Letters patent have been granted for a loom for weaving pile fabrics, which has an auxiliary lay, for the purpose of forcing up the wires before the regular beats. The two lays are so arranged as to operate in concert; the action of the one being governed by the other. In another patented loom for weaving coach lace, the figuring wires are drawn out, and inserted by rollers, acting on them like feed rollers, and at intervals the motions requisite for carrying the wire forward and returning to withdraw another. On one of these looms there are two whip rolls, to compensate for the irregularity of the take-up in figuring.

A very ingenious loom for weaving figured fabrics has been patented, which I should be glad to describe, but it could not be made intelligible. I will merely remark that an important feature of it is that the motions are all positive, and the use of cords is dispensed with; thus avoiding the irregularities consequent upon shrinkage and expansion.

In the last loom I shall mention, the figuring cylinder is placed directly below the harness, which is sustained by rigid frames; points project down from these harness frames to fit perforations in the cylinder. The cylinder may be perforated in such manner that several figures may be woven from it. At each beat of the lay, the cylinder is turned and raised. That part of the harness will be raised, the points on whose frames do not find perforations in the cylinder. If several figures are formed on the cylinder, they must be two or more intervals apart; and there is an adjustment of the apparatus for turning the cylinder accordingly. I may add that in this loom one cylinder may be substituted for another at pleasure.

A large proportion of the inventions patented in this class are real and valuable, and this remark applies, perhaps, more justly to this class than to any other. But the complicated character of the machinery renders it impossible to give, in the form of an annual report, a fair idea of what has actually been done.

I will here close, and submit the foregoing to your consideration. Your knowledge of the arts will satisfy you that it is impossible in the few days allotted to me, to do justice to the inventive genius of this country. I am happy to believe that your own pen has supplied the deficiency in a manner which can leave nothing to be regretted.

Respectfully submitted by

W. P. N. FITZGERALD,
Examiner of Patents.

To Hon. THOMAS EWBANK,
Commissioner of Patents.

Honorable THOMAS EWBANK,

Commissioner of Patents.

SIR:—In conformity with the practice of this office and upon your request, I have the honor herewith to submit a report of the condition of the business entrusted to my charge during the past year, and also a succinct notice of some of the inventions in the various classes of art of which the examination is allotted to me.

At the commencement of the present year there remained upon my desk unacted upon 117 cases, and in addition to these some 20 were transferred to me by one of my colleagues during the year, in order to equalize the amount of business before us; and during the year 502 new cases have in their usual routine been submitted to me for examination, making an aggregate of 639 cases. Of these, 266 applications have been patented and 373 rejected; but as many of these cases have been again submitted to the office with amended claims, and afterwards either patented or again rejected—thus making two and sometimes three reports on one case, the whole number of formal rejections would be swelled to 421—and the number of actual decisions made by me during the year amount to 687.

In many cases it is necessary to return papers for amendment of the claims, accompanied by the reasons of the office for such requisition. It is also often requisite to send back papers for corrections of the description, drawings or oath, or to enable the parties to account for and remedy want of correspondence between the various papers themselves, or between some of them and the model. In any of these instances a careful perusal of the papers and inspection of the drawing and model is indispensable, and written instructions are made out and forwarded to the applicants. If such proceedings as these be taken into account, the whole number of actions upon applications would amount to about 1,226, and it is but justice to state that my assistant has in addition to performing this last class of duties, which in the routine of the office comes under his charge, aided me in the searches requisite to determine upon the novelty of claims. A comparison of these numbers would show the fact, which it is proper to state in terms, that there are at present no cases before me to be acted upon, but this state of business will probably be changed before the close of the day. When the researches necessary not only in the archives of this office, but also in scientific works, and likewise the numerous nice points to be decided upon after such researches are made, are considered by you—it must be evident that such an amount of labor could only be performed under a strong desire to free the office from the accumulation of business that has long been heaped upon it, and it is evident, that although such an exertion has been persevered in for the year, as it were under the spur, still it is equally certain that such a forced action of the mind can hardly be expected to endure, and if the business of this office increases at its customary rate, it will be almost an impossibility not to go behindhand during the ensuing twelve months.

In the *Class of Metallurgy*, which comprehends not only improvements in the manufacture of the metals themselves, but also machines for working them into shape, and likewise many articles manufactured of metals, nearly one hundred patents have been granted. In a brief description of some of these inventions these divisions will, as far as possible, be preserved, and

those machines which relate to the preparation of the ore will naturally first present themselves. Under the name of *Gold Washers or Ore Separators* many such machines have been brought before this office, some of them presenting much more novelty and characterised by greater invention than is usually the case, being in fact new methods of applying physical principles heretofore unemployed in this branch of art.

The discovery of the California gold region and the cession of that country to the United States has given a strong impulse to invention in this species of machines, and some of them are characterised not only by perfect adaptation to their destined use, but also by a refined simplicity and lightness of construction; the latter points having been forced upon the inventors by the length of the route to this new Eldorado, and the difficulty attending their transportation even after their arrival on the coast of California.

These machines are only applicable when the metal exists as such, and in mere mechanical mixture with other substances, and are of no use as far as ores proper or chemical combinations of metals with other elements are concerned.

The simplest of these machines, and one of the action of which, report speaks highly, consists merely of a hollow cone of tin or sheet metal, having a spindle attached to and passing through its apex, and upon its inner side a ledge or shelf of sheet metal fastened, in the shape of the thread of a nut or female screw. The cone is placed with its apex downwards, in such a manner that it can be revolved upon the above mentioned spindle, and the ore and water are thrown into the cavity. If the machine be now shaken a few times these will be intimately mixed, and when a whirling motion is given to it the particles of sand and metal will be thrown by centrifugal force towards the exterior of the cone, but the lighter particles will be near the surface, the heavier ones farther down in the body of the machine.

As a current of water is continually introduced, the former will pass out over the edge of the cone-shaped bowl, and the latter will strike against its sides between the different parts of the before mentioned ledge, and be screwed down into the bottom of the machines, thence to be removed at will, when a sufficient quantity has been accumulated.

A machine depending for its action, as this does, upon centrifugal force and the different specific gravities of the materials to be acted upon, has likewise been patented; it consists of two hollow cones, both revolving, and one within the other; as the particles pass over the edge of the inner cone they are received into the outer one and washed again; but this machine is wanting in the apparatus for forcing the heavy particles to the bottom, and although from its double action it appears calculated to produce a better effect, still it is believed that it will, although efficient, not produce as good results as its more simple competitor.

A modification of the first described machine has also been patented; it has several of the screw shaped ledges, arranged as a many threaded screw, and these are in certain places cut entirely away, thus affording an opportunity to any light particles that may have been caught in the thread, to rise and pass over the edge of the bowl, instead of being forced down with the metal, to the bottom of the same.

Another contrivance has been patented, consisting of three vessels, all open at the top, and placed concentrically, the one within the other. The outside one has a bottom, and is placed with its upper edge below that of the intermediate vessel, the top of which is also lower than that of the inmost vessel

or tube. This latter extends nearly to the bottom of the first, which is shaped like an inverted cone, and the intermediate vessel or tube extends downwards to the base of this cone. A current of water is passed down through the inner tube, and flows thence into the cone-shaped bottom and ascends, and thence passes out over the edge of the outer vessel, through the ring-shaped space between it and the intermediate vessel. The ore is introduced between the inmost vessel and the centre one, falls through the still water contained in the former, and is met by the ascending current before described, which carries the light particles away with it, while the heavier ones fall into the apex of the cone-shaped bottom. In another machine, also depending upon difference in specific gravity and currents of water for its action; a tube, wide-mouthed at one and closed at the other end, is immersed in a stream of water with its mouth towards the descending current; a number of apertures are made in the upper side of this tube, near its lowest end, with adjutages something in shape like the slats of a venitian blind, through which the water rises at an angle of 45 degrees with the horizon, slanting in the same direction as the current; these slats extend through the bottom of, and into a semi-cylindrical vessel, lying horizontal, and likewise closed on the down stream end. Upon a platform attached to this end, the materials to be washed are deposited. The current rising through the slats, strikes this end, stirs up and carries with it a portion of the ore, and is deflected by the end in a reverse current over the upward slanting currents before noticed. The heavy particles fall through the slats into the first named tube, and the lighter ones are borne off by the deflected upward current. It is evident that the heavy particles while falling through the slanting currents, must be continually forced towards the back or down stream and closed end of the machine, and it is thus hardly possible that any metallic particles can escape. The slanting currents acting in connexion with the superior horizontal currents, are the novel features in this machine. Many other contrivances for the same purposes have been patented, and are chiefly modifications of the rockers, shaking or stationary inclined tables, and revolving screens, now in ordinary use for separating metals from the foreign matter that is found deposited with them.

A patent has been granted for an improvement in puddling furnaces, which consists in the application of a species of ash trap between the fire grate and the working bottom of the furnaces, the products of combustion are forced to traverse this passage, and a great portion of the ashes, fine coal, etc., mingled with them are caught there, and prevented from injuring the quality and retarding the process of decarbonization which the iron is undergoing.

An improvement in the shape of the crucibles used in treating the ores of zinc, has likewise been patented, and consists in forming the crucible like a wine bottle, with the bottom rising high up into the interior of the same. The fire is built inside of this bottom, and the heated air, gases, etc., after circulating in the same, pass out under the edges of the bottle's bottom and ascends in flues built along its sides; economy of fuel is the chief object attained.

A process for making steel, in which the chief novelty consists in using pig iron that has been melted in contact with carbonic oxide, as a charge for the converting fire, has been patented; and likewise a process for obtaining wrought iron direct from the ore, which differs but slightly from well known processes; so also has been an arrangement of travelling bloomery or finery fires, that can in turn be brought under the hearth of a blast furnace. It is not known that this last device has been brought into actual use, and there

would appear to be many practical difficulties in the way of its successful operation.

In the process of hammering or shingling, welding and rolling wrought iron, letters patent have been granted for a machine, the invention of a well known iron master, who has heretofore distinguished himself in improvements in his peculiar branch of industry, which promises at no distant day to make a revolution in the forge and the rolling mill, and much decrease the price and improve the quality not only of the heaviest wrought iron shafting, but even of the smallest rods.

This machine consists of three or more conical frusta of metal, confined in a frame, with their smaller ends downwards, in such a manner that revolution may be imparted to all of them, and the axis of each of them is arranged as near as a right line can be, upon the periphery of an imaginary inverted cone, in such a direction that a line drawn through each axis would not point exactly to the apex of the imaginary cone above alluded to, but a little on one side of it. By this arrangement, a space like a hopper is left between the frusta, and gradually diminishes as it descends. Masses of iron at a welding heat, or there about, are thrown into this receptacle, and a rotary motion imparted to the frusta, which, on account of their axes being eccentric to the apex of the imaginary cone, gradually screw the heated mass downwards, compress it, and force it out through the circular space between the smaller ends of the frusta. The iron is therefore drawn out, and as it is drawn, the fibres are twisted so that they are placed in the rod much in such a way as are the yarns in a strand of rope. By giving slight eccentricity to the axis of the frusta, and great velocity of revolution, the strain of them upon their journals may be reduced to any extent required.

Puddlers balls may be squeezed in this machine, shafts of any size may be forged, and round iron of any dimension rolled. In the experimental machine a three inch billet has been rolled down at one operation, to a half inch rod, and to those conversant with forges, this feat will be sufficient proof of the capabilities of the apparatus, and of what may be expected from it when it shall have received those slight modifications which are the invariable result of the frequent construction and continuous operation of any new machine.

A patent has been granted for a machine for rolling the tires of railway wheels from a metal hoop, thus avoiding the bending and welding which are necessary when the tire is formed from a bar. This project is not entirely a new one, having been discussed some years since in England, but the adjuncts and modifications upon which the claims are based are stated to be essentially necessary to the complete success of the process.

Letters patent have likewise been granted for an improvement in the apparatus for regulating the contraction of cast iron car wheels, by means of currents of air, and also for improvements in casting floats and rasps, by means of segmental chills, one for each tooth, the whole being fastened together in a suitable frame; and for several other improvements in the methods of casting diverse articles.

A simple machine for diminishing the circumference of wheel tires, when this process shall have become necessary, either from the stretching of the same, caused by constant jar and wear, or from the shrinking of the wooden parts of the wheel, has been patented. The ordinary method is to divide the tire, cut out a piece, and then weld the ends together; but by this new process the tire is brought to a welding heat at the thinnest or most worn portion of its circumference, and those parts of its periphery on each side of and

contiguous to the heated part are firmly clamped, not between the jaws, but each part in a separate jaw of a powerful vice; the jaws are caused to approach and the heated portion is upset and contracted in length.

A machine for forming the hour glass wire springs, now in extensive use for furniture cushions, dispenses with the mandril now used in their construction, but further description of its operation is not possible without the aid of drawings. This latter remark also applies to an ingenious machine for cutting the teeth of bevel gearing; and likewise to one for grinding and polishing axes and other tools by automatic machinery. The characteristic of the latter being that a rolling and traversing motion is given to the tool, which exposes every portion of it in turn to the grinding or polishing wheel.

Patents have likewise been issued for a machine for making hinges, for regulating the twist in screw augers, for forming wrought iron railroad chairs and for a very ingenious press for forming lead pipe, and applicable, likewise, to many other purposes. This press, unlike most others, surrounds the article to be compressed upon all sides; its top and bottom platens are stationary, and the sides, three or more in number, advance between them toward each other, and to the centre of the body to be acted upon, in such a manner that they always enclose it completely. If lead be the article to be acted upon, the sides are opened to the fullest extent, and the metal in a fluid state is poured into the box formed by them and the platens constituting its top and bottom. The ordinary die and core are made fast in the centre of either top or bottom, and when the sides are caused to advance toward each other the metal will be forced out in the shape of pipe.

Patents have been issued for a machine for cutting files, for several smiths' tuyeres, and for machines for filing and setting the teeth both of straight and circular saws, and also for a large number of machines connected with the manufacture of bolts, rivets, screw blanks, spikes and nails, all of them more or less useful, but none of them presenting striking features of novelty or interest, except where a continuously revolving die holder has been used in lieu of the vibrating or stationary ones hitherto employed. The use of this device renders the operation of the machine almost uninterrupted, and in consequence the quantity of bolts that can be manufactured in a single machine is much increased.

In the subdivision of locks and fastenings, inventions which are classed under the general head of Metallurgy, many patents have been granted, several of which are for bank locks, ingenious and complicated, of which it is impossible to give any clear idea without the aid of drawings. In the ordinary door locks many improvements have been made, two of which will probably come into general use — one consists in a slide or protector, as it is termed, which may be applied to any lock. When the door is closed, the bolt shot, and the key left in the lock, a movement of this protector on the inside shuts the outside key hole, clamps the key, so that it cannot be turned with a pair of nippers, and at the same time locks the latch or knob spindles. The other improvement consists in arranging the parts of an ordinary lock in such a manner with reference to either two key holes or one of a peculiar shape, that the same lock can be employed either as a right or left hand lock, and the key will in neither case need to be turned upside down. By using these locks, builders may order with reference only to the number of doors, paying no attention to the side upon which they are to be hung.

Patents have been granted for improvements in thumb latches, and in porcelain rosettes for door knobs, and also for one on the glass knob, which, although it may appear trifling, still is believed to be of great utility. As the glass or mineral knobs, as they are termed, are usually cast upon solid spindles, they are liable to crack from the unequal expansion of the metal and the glass — many of them do so, and many others are mounted upon the doors, not showing the crack visibly, but with such a want of cohesion among some of their particles that the slightest blow reduces them to fragments. This difficulty has been remedied by making the metallic spindle a thin tube, thus presenting great surface with but little weight; and knobs cast on such spindles may be seen in this office, with which, used as a hammer, a large cut nail has been driven to its head in a plank.

Patents have been granted for ingenious window shutter and blind openers and fasteners, for sash stoppers and balances, for shears, punches, wrenches, etc., which time and space prevent being described.

STEAM AND GAS ENGINES, &c.

In class No. 6, under which are examined all applications for patents for improvements in steam and gas engines, and their appurtenances, some fifty patents have been granted. Among those for improvements in boilers are two for removable fire boxes. The invention consists in constructing them in such a manner that they can be removed at will from the rest of the boiler, by unscrewing certain bolts and tubes, which latter form water and steam connection between the water linings attached to these boxes, and other parts of the boiler. In those boilers, especially locomotive ones, where anthracite coal is burned, either with a strong draft or with a forced blast, this contrivance promises to be of utility.

A patent has been granted for placing inside of the ordinary tubular boiler flue a sheet metal screw, with a very small spindle, around which it is formed. This screw is capable of being revolved, and its periphery is in contact with the inside of the flue. The flame and gases, instead of passing directly through the flue, must, it is obvious, be twisted round and round by these threads, and thus increase to a great extent the effective length of the flue. When the flue becomes choked to any extent, by soot or ashes, if the screw be revolved it will act like a common mill conveyor, scrape the sides of the flue, and carry out the dirt at either end, at pleasure, according to the direction in which it is turned.

A patent has also been granted for certain devices necessary in arranging several sets of grate bars, one above the other, in locomotive boilers, by which it is contended that a greater amount of coal than usual can be burnt within the same fire box rooms, thus attaining a long sought desideratum, namely, increased grate surface, without increased size of fire box.

A curious arrangement of boiler by which a great amount of water is said to be evaporated, with a comparatively small quantity of coal, has been patented. In describing this boiler it may be said to consist first of a hemisphere with a flat bottom, to which are attached water legs formed by placing one tube inside of another, the space between them being filled with water, connecting at the top with the water on the bottom of the hemisphere above described. This space is closed at bottom by a ring shaped piece of metal, and the fire-grate is formed inside of the inner tube, with a sheet iron box below it, to

which air is blown to be heated, and afterwards supplied to the fire. Both the tubes are conical, with their smaller ends down, and the outside tube increases faster in diameter than the inner one; this peculiarity causes both the fire and water spaces to be greatest in area at the top, just under the bottom of the hemispherical chamber. A number of holes are cut through these tubes near their upper ends, and the one in the outer connected to its fellow in the inner, by a short flue riveted fast to both. Outside of the upright water space and at some distance from it, another larger tube also formed like a frustum of a cone, is attached to the outside of the bottom of the hemisphere; its lower and smaller end, extends below the hot air box above named and all other parts of the boiler, and connects with the chimney or smoke pipe. Opposite to the short flues above spoken of, as passing through the upright water space, holes are made in this latter larger tube, and through them are introduced pipes, by means of which hot air from the air box is forced into the flame, meeting it as it comes out of the fire-box, through the short flues. The gaseous products of combustion are thoroughly consumed at this point, being just at the place of greatest fire surface, and afterwards descend between the jacket and the water space; impart their remaining heat to the coldest portion of the water, and the air in the air box, and thence escape by the chimney. This boiler would appear to be essentially non-circulating: the cool water is supplied near the bottom, and rises gradually, becoming hotter and hotter, till it is converted into steam. Moreover, the most intense heat is applied to the hottest water, at the point of most extended fire surface. Almost every principle comprised in this boiler is old; but the arrangement of the devices which bring these principles into effective and economic action, is ingenious and simple in the extreme, and on this arrangement the patent is based.

Patents have been granted for other arrangements of boilers; for the more convenient application of salinometers to marine boilers; for feeding apparatus, and for indicators of too intense heat upon the flues; also for filters, specially applicable to boilers used on our western waters, the arrangement of one of which is ingenious and practical.

A patent has been granted to the original inventor, for a modification of his arrangement of the well known half beam engine, which admits of a stronger attachment to the vessel of some of its essential parts; and to another party for an arrangement peculiarly fitted for low pressure engines, such as are employed in screw propeller steamers, where many revolutions per minute are required. The latter improvement consists in working the air pump piston at a much lower speed than that of the steam piston, and in an arrangement, by which in case of a break down, in either air pump or condenser, the engine can be worked at once as a non-condensing engine.

An arrangement of two single acting expansive cylinders, both attached to one shaft by cranks, forming with each other an angle of 180°, is designed to correct a well known theoretical defect in the action of expansive engines, and to give the steam greatest leverage when it has least tension. The idea has been still farther carried out in beam engines, by placing the shaft to which are attached the cranks, set as before mentioned, nearer to the cylinder than usual, and making both cylinders alternately perform work on the down stroke only.

Many applications have been as usual made for letters patent for inventions in that mechanical chimera, the rotary engine. Most of these have been rejected, the path having been so often trod, that but few spots not imprinted with the inventor's track are to be found. Some of them have been patented, more on the ground that they are new and not injurious, than as preventing

any really practical or valuable contribution to the arts. Two however of the patents granted for improvements in these machines, must in the exercise of a proper discretion, be considered as presenting exceptions to the rule of action above set forth. One of them is for an attachment of the ordinary moving steam abutment of these engines, to a strong arm projecting at right angles from it, to which it is immovably fastened. This arm plays upon a suitable pivot, and the abutment or stop in accommodating itself to the motion of the piston or pistons, describes an arc of a circle instead of a straight line. The strain upon the stop, caused by the pressure of the active steam on one side of it, which is not counteracted by the vacuum, or merely atmospheric pressure on the other side, is by this arrangement transferred from the guide and packing, to the point on which the arm plays, and which it is unnecessary to make steam tight. One cause of great leakage and friction in these engines, is thus in a measure dispensed with.

In the other patent, the claims rest upon such a formation of the stops as will prevent to some extent the leakage of the steam past their sides, between them and inside of the steam case; also upon a certain configuration of the pistons, in combination with a method of operating the stops, calculated together, to make the engine wear more truly, and run with less waste of steam and less friction.

Patents have been granted for several species of valve and cut-off motions, two of the latter of which especially applicable to puppet valves, are so constructed as to enable the engineer to cut-off the steam at any point of the stroke he may desire, and at the same time open the valve to its greatest extent, much more quickly than is usual. In both these contrivances, both emanating from the same inventor, only one eccentric is employed, and although they are rather complicated in other respects, it is believed that by the aid of the perfect workmanship consequent upon the use of modern shaping and fitting tools, they can be so constructed as to become practically useful. Two patents have been granted for machinery connecting the cut-off valves with the governor, in such a manner, that the period at which the connection between the boiler and cylinder is closed, is dependant upon the velocity of the engine. This plan is much more economic than the old one, of connecting the governor with the throttle valves; but the idea is not new with these inventors, their patents depending in both instances upon the arrangement of mechanical movements necessary for carrying it into effect.

Patents have been issued for modifications of piston and stuffing box packings; for improvements in the position and method of constructing the foot valve, and also for a method of constructing a condenser, consisting of concentric annular chambers, each alternate one occupied by steam, or the medium of condensation. The novelty is not in the arrangement, which is an old one, but in the method of manufacture. Two sheets of copper with one of zinc between them, all applied closely together, are bent into a cylindrical shape. Several cylinders thus formed of various size, are arranged concentrically, with their corresponding ends, all upon the same level; both of these are then introduced to a certain extent into the copes of two ordinary moulders' flasks passing about midway into a cavity left therein of the proper extent for the condenser heads and double their thickness. Brass in a melted state is then poured into the cavities, and the ends of the copper cylinders having been previously tinned, the condenser heads are at the same time cast and firmly attached to the cylinders. The whole apparatus is now carried to a planing machine, and the heads planed down until the ends of the cylinders

are exposed. The zinc is now melted out from between the copper plates, and the condenser is finished with the exception of the external case and heads. Tubes of any shape may be employed instead of the cylinders, and a cluster of them in lieu of the concentric chambers will then constitute the condenser.

One of the packings for stuffing boxes, above referred to, is the contrivance of the same inventor. It consists in surrounding the piston rod inside of the stuffing box with a piece of leather, vulcanized India rubber, or some other fit material, in the shape of an hour glass without top or bottom, its neck being in contact with the rod, and its wide ends resting against the periphery of the brass collars or glands usually placed in the top and bottom of the box, which in this case extend into it farther than is customary. A communication is formed between the interior of the stuffing box and a force pump, and fluid is pumped into the space between the inside of the box and the outside of the hour glass, until the pressure in the cavity is a little greater than that in the cylinder; all leakage of steam or vapor is thus prevented, and the rod may be said to move through a fluid packing. Patents have also been granted for several spark arresters, and for an improved arrangement of locomotive wheels; the latter consisting in placing two four wheeled trucks at each end of the engine, with a large pair of driving wheels between them, the axle of the latter being above the top of the boiler. The patent is based upon the combined arrangement.

NAVIGATION AND MARITIME IMPLEMENTS.

In this class between twenty and thirty applications have been patented. The subdivision of propellers having as usual occupied a large proportion of that portion of the examiner's time, which is appropriated to the consideration of inventions in nautical matters. Many applications have been made based upon alleged novelties in the feathering or the vertical float paddle wheel, of the latter of which the well known Morgan's wheel may be taken as the type. All these cases have been rejected as presenting nothing essentially new, and actual but not original inventors have been disappointed merely because they do not make themselves acquainted with the history of invention on this important subject. Such occurrences are, of course, frequent in other ranges of invention, but here is presented the singular fact, of every invention in a certain class of machines having been anticipated.

A patent has been granted for certain novelties in the form of screw propellers, by which sheets of metal much thinner than usual may be employed in their construction; also for a species of sculling paddle, working under water near the vessel's stern, and likewise for certain modifications of the kind of paddle employed by Fitch in connection with his first steamboat upon the Delaware. Both of the latter are more distinguished by ingenuity and complication than by practicability. Certain devices for propelling boats by reaction, a stream of water being forced out on both sides, above the water line, have also been patented. Some new arrangement of a centrifugal pump and the induction channels thereto, and likewise of the pipes and their joints, are the basis of this patent. A model boat constructed according to this plan has been propelled at high speed in the harbor of New York.

Several patents have been issued for life preservers of various kinds, among *which are two for life boats* that deserve notice; in one of these the air cham-

bers at the bow and stern are so formed and placed that the boat cannot rest in the water in any other position than an upright one, and in the other the bottom is a water tight box sliding up and down between the sides; if the boat be upset, and persons clamber upon its bottom, the latter slides down between the sides, leaving the cavity again uppermost and the boat in fact in an upright position: the thwarts are so arranged as to conform themselves to this new position, and after the water is bailed out the boat is again ready for use.

A patent has been issued for a certain combination of old parts in a steamboat, in order to produce a vessel that will be able to tow a load in proportion to its power on canals, and at the same time produce no wave injurious to the banks, the wheel being at the same time arranged in such a manner as that it can receive no injury from the contact with lock-gates or bridges. The boat itself is of a well known form, a single bow and a double stern having a canal or open space between the sterns extending forward about half the length of the vessel. In this open space the wheel with a peculiar bucket is placed. This bucket, or these buckets or floats, instead of being, as usual, plain surfaces, are cylindrical with their concave surface arranged in the direction of the wheel's revolution. The lines on these portions of a cylindrical surface parallel to its axis, are not parallel with, nor in the line of radii of the wheel, but are bent from their inner to their outer ends backwards in a contrary direction to the motion of the wheel, so that they strike the surface of the water when entering in a line nearer to the horizontal than usual, and leave it in nearly a vertical direction. According to the ideas of the inventor all these peculiarities are useful when the wheel is placed as it is in his boat. As the boat passes along, the water rushing upwards from the bottom into the forward part of this canal, would pass by and over the plane bucket entering at the usual angle, but is met and grasped by the concave surface of his paddle entering nearly horizontally, which as it leaves the water vertically by virtue of the same inclination produces almost no wave or swell. If any hurtful amount of the latter be produced, the difficulty is met, and the wave smoothed by another contrivance termed a wave queller, consisting of a curved piece of strong sheet metal, with its convex side downwards, attached at one of its ends by a hinge to a beam crossing the open passage just aft the wheel, and at the other to a screw, by means of which it can be raised or depressed. When the boat is in motion this screw is acted upon and the queller shoved down upon the surface of the water just as far as is necessary to smooth down the swell of the paddle. This boat has proved so successful that its proprietors have been permitted to run it on several canals free of toll.

A patent has been granted for a very ingenious capstan, having an arrangement of cog wheels and pinions within the head and barrel, by means of which the following result is produced.

When a rope is wound round the drum, and the men at the capstan-bars are heaving upon them, if the strain from any cause becomes so heavy that the men are unable to heave it further, then by merely changing the direction of their motion, they act upon the rope in the same direction, but with diminished speed and increased power, obtained by the gearing. When the heavy strain is overcome, the men again change their direction, and the rope comes in with the same speed as at first. Two other patents have been granted for modifications of the so termed pumping windlass, and one for improvements in the screw and nut steering apparatus; another for improvements which enable an anchor to be let go from the cathead with ease and safety; and one

for improvements in deep sea diving bells, enclosed on all sides, and enabling the operator to work under the ordinary atmospheric pressure, instead of under that due to the depth of water beneath which he is immersed. The novelty in this case, consists in the construction and method of fitting the various grasps and handles which pass water tight through the shell of the bell, and enable the diver to act from the inside upon substances outside of the same. Letters patent have been issued for improvements in diving bells, intended for operating in smooth water. The bell, in place of being suspended by a chain or rope, is attached to a strong timber frame, greater in height than the distance from the bottom to the surface of the water, and this frame is arranged in such a manner that it can be depressed and raised upon guides attached to the inner sides of a twin boat or scow.

Patents have been granted for improved machinery for paying the seams of vessels; for improvements in the arrangement of halyards and downhauls, applied to fore and aft sails, rendering them easier to handle and less liable to tear, and for several other improvements in the construction of vessels, or parts of their equipment, which do not require special notice.

CIVIL ENGINEERING AND ARCHITECTURE.

In this class have been patented several improvements in bridges, one of which consists in shaping and framing the top and bottom string pieces of ordinary truss bridges, in such a manner that they shall constitute an elliptical ring instead of the two long sides of a parallelogram, as is usually the case; by this arrangement the upper stringer becomes an arch, the thrust of which is met and counteracted by the tendency which the lower stringer has to separate in the centre, when the bridge is loaded. Both these parts of the bridge have heretofore been curved, with their concaves towards each other, the novelty with reference to such a bridge, would consist in uniting their ends by a continuous curve of equal strength with either of them, through which the tendencies to rupture act in opposition to each other.

Another improvement consists in a method of attaching the truss frame to the arch of a compound bridge, in such a manner that both may be adjusted to each other, in order that each shall sustain its share of the load. A third patent is based upon improvements in swing bridges for railroad tracks. In the ordinary swinging bridges, the clear width of the draw, or space for vessels to pass through, is narrowed by exactly the width of the track and its supporting timbers, when the bridge is swung open. But in this, each lengthwise timber swings on its own separate pivot, and the cross pieces by which it is attached to its fellows are pivoted at their joints. The first named pivots are not in a right line perpendicular to the track, but in an inclined one, each a distance equal to its own thickness behind the other, when looking from the centre of the draw. When the frame thus assembled and pivoted which constitutes the draw, is thrown open, the various parts close in upon and lie close to each other, in a manner similar to the various parts of the ordinary parallel ruler, and obstruct the opening only by the aggregate width of the string pieces, instead of the extent covered by them when in place for the cars to cross the opening.

In the subdivision of railroads, two patents for improved compound rails, deserve notice. The construction of one of these may be described as follows; saw or split in two, any line of ordinary T rails in the direction of their length, which would leave besides the usual openings at the junctions, another

slit the whole length of the track from top to bottom of the rail; then draw one set of halves in either directions, until the junctions between its parts come midway between the junctions of the other set, and bolt the whole together by transverse bolts. A compound break joint rail is thus formed, preventing to a great extent, the jar experienced in passing from one rail to another, and rendering them less liable to be thrown from their proper place on the track. The other rail may be styled an improvement on this one. It has the same peculiarities, but in addition, the sets of halves are formed in such a manner as to leave a continuous hollow or tubular space the whole length of the rail, into which are inserted at the junctions, iron cores, rendering the rail firmer at these weak points. It differs likewise in its exterior form, its cross section being such as would be produced by rounding off the corners of a parallelogram, and bending in all its sides. The rail is thus, as it wears, susceptible of four reversals. A chair peculiarly fitted for supporting it, forms a part of the invention.

Several patents have been granted for arrangements of levers, rods, bolts, &c., connected at one end of the series to railroad switches, and acted upon at the other by a trigger, or its equivalent carried by the locomotive, the arrangement being such that the engine driver is enabled to shift the switch, opening it in either direction at will, without stopping the train or descending from the engine. Another patent has been granted for a very curious modification of a toggle joint, applied in the rail itself, at or near a point where a train of cars is required, when going in one direction, to pass from one track to another, or a turn-out. The up train, for instance, always turning out to the left, and the down train proceeding straight forward. As the forward wheel of the locomotive of the up train presses upon the toggle, the latter acts on levers or their equivalents connected with the switch, and opens the same, forcing the train to enter the turn-out. When the down train comes to the switch, the wheels shut it as usual, then run along the track and pass over the toggle, but when striking it in this direction, the toggle, although it drops down level with the rail, does not act upon the train of levers or the switch; it being clear if it did that the switch would be shifted while the train was upon it, and the cars thrown off. And this is the peculiarity upon which the patent is based, the toggle acting when it is pressed by a train coming in one direction, but having no action, although pressed down by a train approaching from the other.

Patents have been granted for improved methods of ascending inclined planes with locomotive engines; for an apparatus attached to the guards of steamboats for lifting them over shoals; for improvements in the adjustable blocks that support the bilges of ships when in dry dock; for machines for drilling rock, boring earth, dredging and excavating, and in the subdivision of architecture for weather strips and water guards, and methods of constructing stairs.

FIRE-ARMS AND IMPLEMENTS OF WAR.

More than twenty-five patents have been granted in this class, the greater number of them for improvements in repeating or breech loading guns of various descriptions. The great demand for arms of this class during the war with Mexico, and that still existing for supplying the frontier men and those who are travelling overland across the great territories of the west, have proved a strong incentive to invention in weapons of this description. To these may

be added the accounts that have reached us through the foreign periodicals, of the wonderful execution of the so termed Prussian musket, with which, it is stated that correct practice may be made at a range of 800 yards, and that instances have occurred in the war between Prussia and Denmark, where the artillery men of the latter have been picked off at their guns by the infantry of the former, when outside of the effective range of grape shot. This gun may be described as consisting of a barrel open at both ends, but stocked in the ordinary manner. It is loaded by pushing a cartridge into the breech or end nearest the butt of the stock; this end is then closed by a piston or plug of metal which is slidden along and forced into it by a handle; the plug is then turned some twenty degrees upon its axis, the handle entering into a slot in a piece of metal attached to the stock, thus fastening the piston so that it can not be forced backwards when the charge is exploded.

The explosion is effected by means of a needle, moving in a hole in the axis of the piston, which is retracted into the piston and confined there, by the combined action of pulling back the same to open the breech, and shoving it forward to close the opening after the cartridge is in position. A pull upon the usual trigger liberates the needle from its catch, when it is forced forwards by a spiral spring, and its point passes out of the piston into the cartridge, and through the powder contained in the same, until it comes in contact with a small pellet of percussion powder, located in the cartridge, between the powder and the ball. This pellet is fired by the concussion, and inflames the powder from the front towards the rear of the barrel. This gun has been described as a necessary basis for the correct understanding of several others, modifications of, and improvements upon it, patented in this country during the past year, and its advantages would appear to be threefold; first, great rapidity of firing; second, accuracy, and third, extent of range. The former is dependant solely upon the loading at the breech. The second advantage is secured by the breech loading, which permits of a ball being used of greater diameter than any portion of the bore, except for a small distance near the breech, the ball being slugged by the explosion of the powder, and if necessary, forced to fit tightly into rifled grooves; it has therefore no windage. The third result depends upon the last mentioned cause, and the fact that the powder is fired from front to rear, the combined consequence being that the whole charge is exploded, and that none of the gases can escape between the ball and the barrel. A very simple improvement on this gun has been patented, the application of which renders it impossible to fire the gun even by a pull of the trigger unless the breech is in proper position and locked. Three patents have been granted for guns, which have, in addition to the features of the Prussian gun, a reservoir of cartridges under the barrel, and machinery which elevates one charge at a time from the same, and places it in front of the sliding piston, which latter, when moved forwards, shoves the cartridges into place for firing.

A patent has been issued for what appears to be a great improvement upon the ordinary many barreled revolver. It consists in attaching the barrels firmly to the stock in such a manner as to be incapable of revolution, while the lock is so contrived and arranged that it is cocked and discharged by pulls on the trigger, the hammer travelling from barrel to barrel in succession, and firing one after the other. It is obvious that this arrangement of revolving hammer and stationary barrels, permits of more correct practice than the usual one. A patent has been granted for an improvement on this pistol, consisting in an important simplification of the lock. Many new modifications of that species of lock which is cocked by a pull of the trigger have been patented, one of

which is so constructed, that the gun is fired when the pull on the trigger is slacked. Patents have been issued for loading muzzles of rifles; for various kinds of breech loading fire arms; for improvements in concealed locks; for modifications of the faucet breeched gun, and a magazine adapted thereto; for a breech loading, and for a sectional cannon. The construction of the latter may be described as follows: drill any convenient number of holes through the metal of a cannon, midway between the outside of the bore and the outside of the gun and parallel to its axis, then saw the gun through at right angles to these holes in many places. A number of disks will be left each with a corresponding central hole for the bore: with numerous smaller apertures, corresponding in each section, the result of the drilled holes first spoken of, and with an outer periphery, shaped in accordance with that part of the gun from which the disk has been cut. Now if disks of wrought iron formed precisely like these, are manufactured, assembled properly together, and long bolts passed through the small holes, a sectional wrought iron cannon will be formed, which admits of being taken apart at will. Patents have been granted for a very ingenious arrangement of punches, dies, transferers and feeding apparatus for punching out and knocking up percussion caps at one operation; for a machine for spherifying leaden balls; for an improved method of boring muskets, and for improvements in that kind of powder magazine, whose walls are double, with a provision for circulating water in the interstices in case of fire occurring on board the vessel. These improvements consist in a self-acting apparatus for letting on the water, and in a peculiar kind of entrance, preventing the passage of sparks, &c., unless carried in by the person entering. A patent has also been granted for an improved method of making small shot, based upon forcing a strong current of air up through the tower, meeting and to a certain extent supporting the descending lead. Shot of certain sizes can by this process be made in a sheet iron tube in an ordinary house, instead of in the high tower usually employed.

GENERAL MISCELLANEOUS.

In this class but few patents have been granted, one of which is for a street sweeping machine, having certain arrangements of the revolving brush wheels, which sweep the dirt upon the apron; and of the apron itself, which render the machine better adapted to uneven pavements. Another has been issued for improvements in that species of animal trap, in which the weight of the animal to be caught, acting upon a swinging platform, springs the trap. The improvement consists in an arrangement of counterpoise, applied to the platform in such a manner, that no animal of less than any given weight can spring the trap. Improvements in the expanding fish hook have likewise been patented, also a simple and ingenious hook, which will serve if needed for a trap for small animals.

Improvements in bell tents; in ice crushers; fire escapes, and skates, have also been patented.

I have thus endeavored to give briefly as possible, a description which amounts to but little more than an enumeration of some of the inventions, which came under my notice during the past year, and would remark, that a full and complete digest of these discoveries, would if time permitted, be laid before you.

All of which is respectfully submitted.

HENRY B. RENWICK, *Examiner.*

Sir:—In accordance with your instructions, I have the honor to submit a report of the history and present condition of the business of the office committed to my charge.

In my annual report for 1848, I gave as the number of applications on hand 168. But it was found on investigation that 12 applications had been overlooked, and that the number of cases upon my desk not examined on the first day of January, 1849, was 180. I have received during the year 1849, new cases 463; thus making the whole number of applications 643. Of these, 75 have been transferred to the classes of the other Examiners, and 569 have been acted on by me.

On the 31st of December I had no cases unexamined on my desk.

The classes referred to me for examination are the following:

1. *Agriculture*—embracing all instruments used in cultivating the ground, and collecting and preparing its various products for the market.

2. *Chemistry*—embracing all chemical processes and chemical compounds.

3. *Leather*—embracing all operations in tanning and dressing leather, including the tools and machines used for such purposes; also the manufacture of leather into boots, shoes, saddles, harness, and all other articles usually made of leather.

4. *Household Furniture*—including machines and implements for domestic purposes, or such as are peculiar to the house.

5. *Wearing Apparel*, and articles for the toilet, with the construction of the implements and machines used for their manufacture.

Of the whole number of cases examined by me, 245 have been ordered to issue, and 354 have been rejected, or postponed for amendment, or are otherwise pending. It should be observed however, that the above statement does not give the amount of work done at my desk, but only an approximation to it. Many of the rejections noted above, are re-examinations of cases brought up again from the last year's work. Also many of the issues of 1849 were final actions on cases pending in 1848.

Many of the applications are rejected from defects in claims, in description, or from other causes, and afterwards from modification, explanation, or other amendments, claims are admitted. So that it often happens that a single application is at first rejected, then the applicant asks a reconsideration, insisting on the same claim, under plea of a want of explanation, or a misunderstanding of the invention by the office. The application is examined again, and rejected as before; finally he relinquishes the main claim and accepts one for some minor point. Thus the same application that has been twice recorded as rejected is also at last recorded as issued—and three distinct actions are had on the same application, two rejections, and one issue.

Again, it occasionally happens that an application is rejected once, or twice even, then withdrawn and filed anew and rejected again, and afterwards by relinquishing parts of the claims, a patent is finally issued on the remainder. Thus three or four rejections and an issue may arise out of a single application.

Each of the five classes referred to me for examination is divided naturally into several groups, the peculiarity of which generally depends upon the object to be obtained.

These groups are well defined in *Agriculture*, *Household Furniture*, and in *Leather*; while in *Chemistry* they are as various as the subjects of the invention.

It is a fact worthy of remark that the progress of invention in the different classes, or in the groups of each, is by no means uniform. One group of subjects obtains notoriety from a signal invention; and the attention of inventors is directed to it, and new applications of mental energy are concentrated upon it, until new inventions have covered the ground, embracing not only the accomplishment of the work itself, but exhibiting a great variety of methods in detail, either different from, or equivalent to, such as were before in use.

Thus, every new field of invention opened by one, brings about it a crowd of other inventors, some to improve on the original, and others to pirate and rob the originator of his just earnings. Such was the fate of the inventor of the cotton gin, and such is now being designed on the inventor of the electro-magnetic telegraph. Each of these inventions when first promulgated was regarded by most as chimerical; but the first evidence of success elicited the attention of others, and soon numerous competitors appeared to contend for the honor or profit of the invention.

For many years of the earlier history of the American Patent Office, stoves, washing machines and ploughs were fruitful sources of invention. Since then new fields of industry have been opened, and new subjects of invention have been introduced. The labors of Whitney served to people the cotton growing parallels, while those of Fulton transported their products to the market, and those of Arkwright fitted them for the consumer. Each of these great landmarks served in turn as common centres, around which thronged hundreds and thousands of inventors, whose names and whose labors will be handed down to the latest posterity.

The currents of invention in the United States are controlled, not by the will, or the munificence of individuals, or state or general government, but by circumstances or the necessity of the case.

The sparse population, the abundance of prairies in the west, the ease with which almost any one may become a landholder and owner, the consequent high price of labor, and the ease with which animal power can be produced on the soil; all these conspire to force upon the agriculturist the necessity of cultivating the soil by animal power. To devise and construct suitable implements for this purpose, constitutes the province of the inventor, and as we shall see in the sequel, he has not been idle. Valuable inventions have been made. The most important improvements in agricultural machines the past year, are believed to be in what are called *seed planting machines* and *harvesting machines*. The former embrace the planting of every variety of seeds that are used, and the latter are mostly confined to grain, grass and cotton; these will be again noticed in their proper place.

The most important and valuable inventions that have come under the cognizance of your examiner during the past year, are to be found in the class of chemistry. Two of these are the results of the labors of two distinguished professors of chemistry, and the third from those of a highly respectable practitioner in medicine.

The first is a process of manufacturing sugar on the plantation, so as to save a large portion of the loss sustained by processes now in use.

The second consists in a process of converting animal matter, as fish,

horseflesh, butchers' offal, &c., into ammoniacal salts, or other more fixed compounds, that can be used for manure or other purposes.

The third invention referred to consists in the introduction of a new ingredient, and of a new, simpler and safer process, in the manufacture of printers' ink.

Although it has so happened that the patents which will probably be granted for these several inventions have not yet been issued, in consequence of the prolonged correspondence, still it was deemed proper to announce them and notice them in the present report.

In all the departments of the arts, the progress of inventions constantly narrows the limits of each, until we at length arrive at a point where the invention is very small, or where none can be found worthy of a patent. Such is the present condition of several of the groups, as bee-hives, washing machines, ploughs, churns and bedstead fastenings. Inventors have so much refined in their devices and claims on several of these subjects, that the claims are often for distinctions without a practical difference. Such is the case especially with churns and washing machines; and the same remark applies equally to ploughs and bee-hives. The field of invention in all of these groups is so narrowed down that there seems to be left little room for improvement. In some of these the current of invention seems to be directed into a channel that can never give any very useful results. Such is believed to be the case with the invention of moth traps in bee-hives. This subject, however, will be further discussed under "Bee-hives."

We will now consider the individual groups of the several classes of subjects examined by me.

AGRICULTURE.

Agriculture constitutes the largest class in my department. There have been granted in this division 117 patents.

For churns and butter workers	10	Grain and rice hullers	8
Ploughs	15	Fanning mills	9
Cultivators	6	Corn-shellers	7
Seed planters	20	Straw-cutters	5
Rakes	4	Bee-hives	5
Harvesting machines	15	Curry combs	2
Threshing machines and separators	9	Ox yokes	2

Churns.—As most of this subdivision was transferred to Dr. Page in the early part of the year, and as few important improvements have come under my notice, I would respectfully refer you to Dr. Page's report for further information on this subject.

Ploughs.—Of the fifteen ploughs patented, only one seems to require any special notice, as they are, with this exception, claims on unimportant devices.

The plough referred to is of that denomination called hill-side ploughs, and the peculiarity may be described in a few words:

A horizontal frame is constructed somewhat resembling that of the body of a wheelbarrow, but the handles, like those of the plough, project upwards and backwards. Near the middle of the body of the frame is made a fore-

and-aft rectangular opening, in which the two shares, fitted to a cross axle, rotate like the wheel of a wheelbarrow. Although there is no wheel in the plough, the rotation of the two shares describes a circle in the direction and position of the wheelbarrow wheel. And if we suppose two ordinary cast-iron ploughshares, made fast to the periphery of the wheel of a barrow, in the rectangular opening, and the shares so arranged that one shall be on the upper and the other on the lower part of the wheel, one pointing forward and the other backward, the bottom of the plough being in the line of the tangent to the circle described by the rotation, we shall have some idea of the construction of the machine. The peculiarity of the feature in the plough is, that it rotates in the direction parallel with the furrow, instead of at right angles to it, as in other ploughs of this class.

The shares are locked by means of a sliding cross-bar, moved by a handle. The cross-bar is received against a notch in the mould-board that is uppermost.

Cultivators.—Six cultivators have been patented during the year. Most of these are of ordinary construction, and the claims for minor improvements that do not set forth any very prominent new features.

One of the most important of these is worthy of some notice here. It consists of an ordinary frame of the triangular form, five or more teeth arranged in three or more rows, so fitted upon a slide-block as to slide in slots on cross-bars from side to side, and governed by means of screws or screw rods that pass horizontally through the side pieces and into the block that supports the tooth, and moves with it from side to side. The screw rods are used to set the teeth at any required distance from each other in a side direction. Besides the arrangement for the side movement of the teeth, the latter are hinged to the sliding blocks so as to admit of a swinging motion backwards and forwards. The teeth are braced in the rear by screw rods passing downwards and forwards at an angle of forty-five degrees through a projection on the rear part of the sliding block, which rod is united to the back part of the tooth by means of a hinge joint similar to the first. By means of these screw bracing rods and set nuts on each side of the projecting part of the sliding block, the teeth of the cultivator may be set at any inclination backwards and forwards that circumstances may require.

Seed Planters.—There have been patented twenty seed planters. One of these was a re-issue, and one an additional improvement.

It will be evident, from a comparison of the number of patents granted the past year with those of any former year, that from some cause an unusual interest has been excited in this class of labor-saving machines.

It would be difficult to set forth, without the aid of drawings (as we are compelled to do,) the features of improvement in devices for seed planting, except in a very general manner. In seed planting, whether it be in hills, in drills, or broadcast, it is important that the manager of the apparatus should be able to have the seed-distributing apparatus and the cultivating and covering apparatus, each and all, perfectly at his command and control; so that he may be able, by a single movement of a lever, to stop instantaneously and simultaneously the seed-distributing and the cultivating apparatus. Most of the seed planters herein referred to contain various and modified devices for this purpose.

When seed planters were first introduced they were generally small machines, and generally confined to drilling in a single row; now it is common to work eight drills or distributing boxes to a machine. And as the number

of distributors increases, so increases the necessity of controlling and working the whole machinery simultaneously. The device, therefore, which, for the controlling and moving simultaneously the seeding and cultivating parts of a one-drill seed barrow, is of little moment, becomes vastly important in a machine with eight or ten. But the device is the same in the latter as in the former, except the multiplication of the individual drills, (and this last has not been considered, in the practice of the office, a patentable invention.)

Now it so happens that a one-drill seeding machine was patented in 1841, having in it the simultaneous movement above referred to, but so imperfectly described, represented, and claimed, as to lead one to believe that the inventor himself did not regard it of much importance, or perhaps did not understand its bearing on the subject until others had introduced larger machines with devices for attaining the same end. The device was so obscurely set forth that it did not attract the attention of the office until the case was called up for a re-issue, and in accordance with the law of re-issues, the patentee was permitted to re-describe and cover by claim those devices that were found in the original model and drawing, although not clearly set forth in the specification.

This seems to be one of those cases where the law of re-issues acts badly; for inventors, not knowing that devices which are so obscurely set forth in existing patents as not even to give notice of their existence, may come up in a new form in a re-issue, and cover the field and labors of those who had supposed themselves working on unoccupied ground.

There is one other point worthy of notice, in the improvement of teeth common to seed planters and cultivators. It is the use of springs to prevent the breaking of the teeth by means of firm obstructing substances, as stumps, fast rocks, &c.

It is not new to use springs in the construction of cultivator teeth, but so using them as to be able to adjust their resistance, to that of any given soil without yielding, but when they meet a firm resisting body, the points of the teeth yield and draw backwards, and the tooth thus slides over the obstruction; this is new in cultivators and seed planters. The device is thus constructed: The teeth are arranged on a horizontal rod, which passes through them about two thirds the way from the points upward, and extends from side to side of the machine, so that they are susceptible of vibrating backwards and forwards on this rod, as a pivot or axis. The head of the tooth is sustained in its ordinary position, by means of a spring resting against its anterior face. The strength of the spring is adjusted by a screw, so as to make its resistance equal to the soil it is intended to cultivate.

Harvesting Machines.—Under this head I have included all the machines used to cut and collect grain and grass, as well as cotton harvesters and bog cutters.

On grain and grass harvesters there have been made several minor improvements, but no new general feature has been invented during the year. Twelve grain and grass harvesters have been patented. Most of the improvements have been made on the contrivances for raking and delivering in bundles the cut grain or grass, and depositing the same in such manner as circumstances require. These devices are complicated in their character, and could not be understood from a description without drawings. In one kind of machine the grain is cut and thrown upon a platform, whence a rake, the head of which lying

immediately under the platform, and the teeth of which project upward through the spaces between the planks of the same, at each backward movement, sweep the grain from the front to the rear, whence it is deposited on the ground in suitable parcels to be bound. Much of the art of inventors has been applied in improving the rakes and the platforms.

One important new feature in grass cutters, has been patented during the year, the design of which is to enable the cutters to clear themselves, without any artificial aid from the man who attends the machine. It is an improved form of cutter tooth, and consists of the ordinary horizontal vibrating blade, with a saw-tooth edge, and the device is the punching of a triangular hole through each tooth, leaving the edges of the hole sharp, so that when the blade vibrates in the horizontal slots through the fingers, the sharp edges of these triangular holes, shall cut and scrape off any gummy or other matter that might collect on the blade.

Of the above mentioned twelve grain and grass harvesters, two are designed for collecting clover heads, and do not differ very much from some of the earlier of the grain harvesters, which were designed to cut off merely the heads of the grain. The cutting apparatus consists merely of a horizontal row of fingers projecting forward, and between each, the contiguous edges of the fingers being made sharp, and meeting at the base or hand portion, the clover heads are carried in, as the machine moves forward, and either cut off at the sides, or pulled or cut off at the base of the fingers, and the arms of the reel sweeping past, or some other analogous device, sweeps the heads backward upon the platform where they are collected.

In this group are included one patent for a scythe snath, one for a bog cutter, and one for a cotton harvester.

The Cotton Harvester is a new machine so far as is known to the office, and when we take into the account the time, and the expense to the planter of gathering his cotton in the ordinary way, it is but justice to say that he who succeeds in using machinery to pick the cotton from the bolls, will confer a favor on the cotton growing region next in importance to that of the cotton gin of Whitney.

This machine is designed to supply the place of the hand picking, now everywhere in use.

The principle of collecting the cotton from the seeds, as used in the cotton gin, is here applied to collect the cotton from the bolls, and to separate it from the leaves and stalks and other refuse matter of the plant.

In its general construction, the machine consists of an oblong frame on a pair of wheels, to be drawn by a horse or horses travelling between the rows, the wheels running astride one of the rows.

The machinery for collecting the cotton, is placed midway between the wheels, and receives the bolls of the plant as the machine moves forward. For this purpose a channel or passage is made from the front to the rear, through the middle of the machine, extending as high up as to the axle tree, and is floored over above it. This passage is wide at the front to take in the whole of the plant, and gradually narrows as we approach the axle-tree, and from thence to the rear, the width is uniform.

In the anterior portion of this passage, the sides converging collect the cotton bolls together, where they are caught by the teeth of the pickers. On each of these sides is placed in the anterior or converging portion, a broad disk of a wheel, extending from near the ground to the upper part of the ma-

chine, having its disk covered with teeth like those of a saw, set obliquely and in one direction, which rotate with rapidity, and seize the bolls of the plant as they enter the passage, and tear out the cotton. Should any of the cotton escape the first set of pickers, there is a second pair near the rear of the machine, where it will be collected in the same manner as before described, except that the teeth in this case instead of being on the disk of a wheel, are placed on the periphery of a vertical cylinder, and carry the cotton around upon one side, where the fluted strippers clear it, and deposit it in a box. This machine as before mentioned, is the first of its kind presented to the office for a patent; it will of course be improved.

The practicability of this machine for taking the place of the present mode of picking cotton, considering that the machine must so tear to pieces the bolls, whether ripe or not so, that the cotton can never be picked but once, and how this can be reconciled with the present practice of picking two or three times, which is founded on the fact that only a part of the bolls ripen at a time, are questions to be settled by the cotton planter, and not by the office. Perhaps the first picking may be done as usual by hand, and the last by the machine, and thus the power picker when it shall be improved, subserve a valuable aid to the planter.

Grain Rakes.—Under this head have been granted five patents. Most of these are for minor points of improvement, which do not require any special notice.

One of these contains a device for the application of springs to the teeth, to enable them to ride over obstructions in the same manner as the spring teeth in cultivators and seed planters.

Threshers and Grain Separators.—Under this head have been granted nine patents. Four of these designed for separating grain from the straw, three for threshing only, one for threshing and grain separating, and one for a grain carrier.

These machines contain sufficient improvement to indicate general progress in the art, although there is no prominent feature that requires special notice.

Hulling Machines.—Under this head have been patented nine machines. Of these, three were designed especially for rice, two for buckwheat, one for clover and grain, and three for smut machines.

A patent has been granted for the use of vulcanized India rubber to cover the cylinder and the concave of cylindrical rice hullers. The form of the rubber in this case, is that of a conical cylinder, placed in the upright position, and the concave is made to conform to it. It is contended by the patentee that this material possesses peculiarities rendering it specially adapted to the business under consideration. The adhesive character of the rubber enabling it to hold fast to the hulls, while the rotation tears off the grain and carries it through the machine.

A second patent was granted for a modification of the caoutchouc rubbing surfaces on a horizontal cylinder, in which, if we suppose the cylinder divided into three sections, the rubber occupying one extremity, and less than one third, the brushes occupying the middle section, and more than a third, and the flannel surface occupying less than a third, at the opposite extremity, we have a general idea of the character of the invention.

The grain to be hulled is fed in at the rubber end of the cylinder, and by the arrangement of the rubbing surfaces, is carried forward between the cylinder and concave, to the opposite end, where it is delivered.

A patent for a smut machine has also been granted, containing a peculiar arrangement of screens above the mouth of the mill, in which the shoe shaken in the usual manner by the rotation of the vertical shaft of the beaters, separates on one side the materials larger than the grain, and those smaller than the grain, on the other side. A limited claim was granted for this feature.

Winnowing Machines.—No very prominent features in winnowing machines have been invented. But under this division have been granted nine patents, one of which is a re-issue.

A patent has been granted for a peculiar device in which the rubbing or friction surfaces are leather. The design of the machine is for clearing rat dung from wheat, by means of a soft or yielding surface, and not injure the grain.

Corn Shellers.—Seven patents have been granted, all for minor improvements which do not require any special notice.

Straw Cutters.—Five patents have been granted for different modifications of straw cutters.

One of these has some peculiarities worthy of notice, although the feature is not a very prominent one.

The straw is fed to the cutters, (both of which move against each other somewhat like a pair of shears,) by means of a rake, the head of which is moved by being connected with the cutter frame by means of cams and levers, the details of which could not be understood without drawings; the movements of the rake are as follows:

The head extending across the feed box, with its teeth projecting downward, is allowed to fall into the straw as the cutters open, and as they begin to close, a lever connected with the cutter frame pulls the rake, and consequently the straw towards, and a portion of it between the cutters, which last, as they come together, sever it. Feed rollers are not required, as the rake performs the part of a substitute.

Bee Hives.—Five patents have been granted, of which one is a re-issue.

In the construction of bee hives and the cultivation of bees, if we may judge from the English and American books of the present day, on that subject, it would appear that for many years we have learned little or nothing that is new in the character of this interesting class of animals. The English books written in the meantime, are little more than mere copies of each other, without adding much to our existing stock of knowledge. The information of our people whose knowledge is derived from such sources, must of course resemble its original. On the other hand, those who have not read books at all, but have confined themselves to their own apiaries, without even knowing what others beyond their contiguous neighbors have done, have generally groped in darkness, for the want of a little philosophy to guide them in their researches. Hence, it happens that in our Southern and Middle States, abounding in the bee-moth, inventors have exhausted their brains and their purses in inventing moth traps, all of which, in practice, have failed to accomplish the object. Instead of studying the character and habits of the bee, and of the moth in their different stages, and thus learning by experiment how far, and in what circumstances the bee is able to resist the encroachments of the moth, they have been satisfied with battling the full grown miller, with traps and gins, and luring signal lanterns, that have proved in all cases unsuccessful. Even if it be admitted that a trap secures the majority of the moths, a single one will deposite her hundreds of eggs, and thus introduce her progeny and defeat the whole aim and object of the traps.

Some twelve or fifteen patents have been granted for devices, or traps, to catch the bee-moth, and as many more applications rejected in the course of ten or twelve years, a space which covers the history of patent moth traps in this country.

It would be out of place for me to attempt writing an essay on the cultivation of bees. But when inventors are seeking remedies for defects in channels where it is known that the search must be unsuccessful, it is but proper that the attention should be turned out of a course so evidently wrong, that time and labor may no longer be wasted in unsuccessful efforts.

The moth or miller deposites her eggs in the crevices about the hive. She does not seek to enter where the bees are. It is obvious, therefore, that the first aim should be to prevent any crevices existing where eggs could be deposited, and the enemy allowed a place to harbor in. There is, perhaps, no application of science to the useful arts so much needed as in this very case. If the agriculturists of our country twelve years ago, instead of devoting twelve years to the invention of mere fly traps, had applied themselves to the study of the character and habits of the bee and the moth, they would, in this manner, have rendered these subjects as familiar as moth traps are now. But as it is, the mass of inventors have studied the devices of moth traps in their work shops, and have hardly enquired into the character of the animals to be caught.

What is most needed at the present time in the cultivation of the honey bees, so far as it regards the protection of these animals from the insects infesting the hives, is a good work giving an accurate account of all the insects which are known to infest bee-hives in the United States, their habits and peculiarities, the genus and species of each, the means they have of protecting themselves from the weapons of the bee, and under what circumstances the bee becomes overpowered by them. These facts and conditions, once clearly set forth, would enable the apiarian to construct bee-hives and apply his skill to some useful purpose.

Those who desire to know what is doing at the present day in other countries, will find that a large amount of information is poured forth from the German press, but unfortunately little of this is translated into our own language.

With regard to the history of the bee-moth, the reputed principal enemy of the bee in this latitude, I have been permitted to avail myself of the knowledge of a friend, who is a naturalist of note in our country, and who has devoted many years to the subject of Entomology, and whose remarks appended hereto are worthy of consideration:

"The natural duration of life in the honey-bee is about one year. The offspring of the first swarm will continue to occupy the same hive for an indefinite period, but they deteriorate in numbers and vigor, while those which occupy newer and cleaner hives are known to improve; attempts to recruit the old hive with other swarms, is like 'putting new wine into old bottles,' and seldom answers a good end.

"Many applications for patents are made for devices intended to prevent the separation of bees as their progeny increases, by enlarging the hive, but as each generation seeks to establish an independent household, any measure taken to prevent this natural course must be attended with disorder in the family. The parents in such cases will be hampered and the young dispirited; colateral hives appear to be the most successful. The natural proportion of the sexes and their progeny cannot be governed by the ingenuity of man

without danger to the regularity of succession; hence all the attempts to reduce the number of drones, or in other words, the male bees, must be regarded as prejudicial.

"The bee-moth, (Galleria cereana of Fabricius,) so much dreaded by apiarians, was first brought to this country by the early immigrants from Europe, with their bees. It varies so much in size and appearance that many names have been given to it, even by experienced entomologists. Thus even Linnæus named the male *Tortrix Cereana*, and the female *Tinea Mellonella*. Consequently it will be seen that all the moth traps predicated to be good, upon their size being such as to admit and detain the moths, and not the bees, can be of little avail.

"Two broods of the moth appear in the course of the year, one being in the perfect or moth state in April, and the other in August; hence to guard against their depredations, the hives should be guarded most carefully in those months. The dread of these insects is, however, greater than they deserve, their injuries being more imaginary than real. The larvæ of the moths feed principally on old combs which have been long in use, and in old hives where the bees are few and weak, consequently if the bees are in a healthy condition, with proper accommodation, little food or room will be left for the larvæ of the moths, their injuries arising rather from the weak and inefficient state of the bees—being an effect, not a cause."

Miscellaneous of Agriculture.—Under this head have been granted two patents for slight improvements in the construction of ox-yokes, and two others for modifications of curry combs, none of which require further notice.

CHEMISTRY.

Under this head forty-four patents have been issued, embraced in twenty-nine different subjects, as follows:

Manufacture of sugar,	5
Compounds for lubricating machinery,	3
Manufacture of pearlash,	1
Composition of matter for kindling fires,	1
Process of gilding on metals,	1
Process of manufacturing paper veneer,	1
Printer's ink, substituting rosin oil for linseed oil,	1
Mineral compost manure,	1
Dyeing compound and process,	2
Distilling liquors,	3
Distilling sea water,	1
Manufacture of Paris green,	1
Tanning by electricity,	1
Beer-fountain,	1
Alloys for different purposes,	4
Bread-making, composition for	1
Preparation of oak-wood extract to be used in the manufacture of beer,	1
Process of preparing metallic patterns for casting,	1
Composition in imitation of marble,	1
Process of salting meat by rotatory movement,	1
Process of hardening metals by currents under water,	1

Manufacture of Indian rubber, 2 re-issues, 1 issue,	3
Manufacture of illuminating gas,	2
Process of glazing pottery,	1
Bottle fastening,	1
Hemp-rotting apparatus and process,	1
Coating iron with copper,	1
Curing tobacco,	1
Candle moulds,	1

Besides the above subjects of letters patent, two other applications have been presented and the claims decided on, but not in time to be issued in 1849. As one of these has been already published, and the other ordered to issue, it is deemed proper to include them in this report.

The former of these is for the use of a new material and a new process in the manufacture of sugar by a distinguished professor in a foreign university; and the latter is for the use of a new process in the preparation of animal matter for preservation or for a manure, by a no less distinguished professor of our own country.

The first named subject under the class of chemistry is the manufacture of sugar; an article indispensable to the wants of man, and the manufacture of which has risen to a high degree of perfection, both in our own Southern States, and in some of the islands of the West Indies.

Two of the patents granted under this head are for slight modifications of the sugar pan, on patents before granted to the same individual, and require no particular notice; one is for draining sugar in the cask in which it is sent to the market, and one for a modification of "blow up" pipes, for clarifying; neither of these requires any further remark, as they are for slight improvements.

The remaining patent granted on this subject is for the use of salts of lead in defecating cane juice, and precipitating the lead by means of sulphurous acid, which combining with the oxide of lead, forms an insoluble sulphite which is precipitated, and this is easily removed from the saccharine matter, carrying down with it the various feculencies contained in the sugar cane.

This material is designed to be used as a substitute for the albuminous matter usually employed for clarifying in refining sugars.

The use of salts of lead in defecating syrups is not new, but the use of sulphurous acid for separating the lead from the saccharine liquor, it is believed had not been hitherto known in the art of sugar manufacturing. A patent has been obtained in England, and one on the continent.

But by far the most important improvement that has been announced among the applications examined at my desk, is the use of a salt not hitherto employed in this manufacture for defecating cane juice, which salt, after performing the office of a defecator, by continuing the heat, becomes insoluble, and falls to the bottom without the addition of any other material whatever.

The salt here referred to is the acid sulphite of lime, or what is preferred by the inventor, the bi-sulphite of lime, which is soluble in water, and in saccharine solutions, but which, by continuous ebullition, becomes converted into sulphate of lime, or plaster of paris, which is insoluble, and is thus easily removed from the liquids containing it. The sulphurous acid exposed to air or oxygen, has a tendency constantly to take up more oxygen, and thus becomes sulphuric acid; but the lime being present, prevents the action peculiar to

acids on the cane sugar, and thus the condition of the sugar is preserved for an indefinite length of time, without change.

This power of preventing fermentation possessed by the salt in question, enables the manufacturer to take all the time necessary to perform the evaporation of the saccharine liquors, and at the same time prevents the formation of molasses. It is plain, therefore, what part of this branch of industry is effected by the discovery under consideration. When used on the plantation, it will save a good priced sugar for the planter, in place of the inferior qualities now furnished, also a good quality of sugar, in place of the molasses now furnished. Besides, it is well known to the sugar planter that the most successful manufacturer removes, by the rollers, from the cane, only two-thirds of the sugar contained in it. The remainder, under the usual methods of working, being not worth the labor and expense of separating. But with the improvement here contemplated, ample time, and sure means of preventing decomposition, will enable the planter to remove the remainder of sugar from the begasse, by means of water and an extra rolling. As this invention and discovery is one of great importance, which must powerfully affect the sugar planting interest of our Southern States, and that of the West India Islands, diminishing very much the amount of inferior sugars and of molasses in our markets, and as the discovery is not one of accident or chance, as often happens, I think it not only justifiable, but very desirable, to present so much of the history of the discovery and its application to the useful arts, as appertains to the manufacture of cane sugar, as nearly as may be, in the words of the author.

"Every one knows with what rapidity the juice of sugar cane changes character in warm climates where it is made; and, although this alteration is less rapid in the juice of beets, it is sufficient to create difficulty, and every means has been tried, to make the manufacture as rapid as possible, in order to avoid this cause of trouble and loss.

"For the chemist who makes an analysis, the problem of the extraction of sugar is solved by the use of alcohol. He by this agent separates the saccharine matter from the fermenting substances, and destroys the latter without injuring the former, thus preserving the sugar from any destructive influence. But for a large operation, it is necessary that the agent should be cheap and easily managed. Alcohol is dear; its use requires the greatest precaution, and is very dangerous. Setting aside then, alcohol, is it impossible for chemistry to produce a liquid which has the properties essential for this case, and which, like alcohol, will prevent all fermentation, even when exposed to the air? I think not. I do not even pretend to say that the system which, after many trials, I have considered the best yet known, is either the only one, or better than any other.

"In the sugar cane or beet, there is saccharine matter dissolved in water, nevertheless, this matter rests in that form a long time without change. If we could then make use of water as a solvent, in the same manner that nature does, we should extract the sugar without destroying its quality. The difficulties exist neither in the water nor the sugar, but in the air and in the fermenting matter contained in the cells formed by the tissue, which the contact of water puts in action. This being the case, is it possible to crush the cane, or grate the beet in a vacuum, and extract the juice, and boil it without removing it from this vacuum? If it is possible to do this on a large scale, the problem is solved. But this system seemed to me impracticable, and I have not tried it.

"It would appear easier to arrive at the desired result by operating with an inert gas, such as carbonic acid. To grate the beets in carbonic acid, to wash them in water charged with carbonic acid, and to water them upon the grater with water containing carbonate of lime, or carbonate of magnesia. My essays have not had the success I hoped. The least trace of air is sufficient, and these agents do not seem entirely to annul its effects. Their action is therefore uncertain.

"I will mention here (only by way of observation,) a class of bodies to which recourse is often had to prevent fermentation. These are the metallic oxides, capable of combining with the fermenting matters, or the substances from which they are produced, and forming insoluble compositions. The oxide of mercury and the oxide of lead are in this category. For an analysis in the laboratory, the sub-acetate of lead may be easily and certainly employed, for it precipitates the fermenting substances, and everything capable of producing them, and leaves the sugar dissolved. But the unhappy consequences of employing it are too easily to be seen, and have been but too certainly realized every time it has been used in the manufacture of sugar, to permit me to believe in the possibility of using it.

"The action of tanin and monohydrated phosphoric acid is different. These two agents coagulate the fermenting substances, precipitate the matters that form them, and purify without heat, the juice of either sugar cane or beets in a manner that renders their application possible.

"I thought that I should approach the discovery I sought for, in trying—

"First. To prevent fermentation during the extraction of the juice, and to avoid the contact of the air while the juice was cold.

"Second. To profit by the coagulation of the fermenting substances, caused by heat, to carry them off, as is practised in defecation.

"For this purpose, I sought a substance having a great affinity for oxygen, without action on the saccharine matter, or danger to man, cheap, easy to produce any where, or to transport.

"Three substances particularly fixed my attention; the bin-oxide of azote, sulphurous acid, and aldehyde. This remarkable class of compositions, having a great affinity for oxygen, and which contain already two equivalents of this body, and absorb a third with facility, to produce acids, appeared to me eminently proper to fulfil one of the conditions mentioned, viz: to prevent by their presence the oxygen of the air from acting in producing fermentation.

"I have no doubt but that some one more capable than myself, will ultimately succeed in giving a practical form to the bin-oxide of azote, for I cannot believe but that a substance which destroys instantly oxygen, and forms with it an acid proper to precipitate the fermenting matters, will be one day employed in the extraction of sugar. Dissolved in the sulphate of iron, it would guaranty the juice from all alteration, until the end of the defecation by lime, and this accomplished, the juice would retain scarcely a trace of the reagents employed.

"Aldehyde, or the organic substances which resemble it, are too dear. I therefore made no stop at them.

"During all the experiments which I slightly mention, I found myself always inclined to return to the use of sulphurous acid. Its efficacy as an obstacle to fermentation, is so well proved, its price is so low, its production so easy, and the substances necessary to produce it so universal. It is true that sulphurous acid, which was so successful in the hands of Proust when used to prevent fermentation in the saccharine matter of grapes, has always presented

when applied to the manufacture of beet sugar, insurmountable objections. I was not ignorant either, that the most experienced persons had failed in the attempt to use it. Nothing practical had resulted from their efforts.

"If sulphurous acid can be profitably used where the must of grapes is concerned, if in preventing fermentation, it has no influence on the sugar, it is because it possesses at once, these two properties either of itself, or because it is converted into sulphuric acid by the action of the air. Every one knows, on the contrary, that the cane sugar is changed, and takes the nature of grape sugar, when placed in contact with acids, particularly with sulphuric acid. Thus, however inoffensive the sulphurous acid is when applied to the must of grapes, it is impossible to use it for the juice of the sugar cane or the beet; for as soon as the air absorbed by the sulphurous acid changes it into sulphuric acid, the effect of this last, on the juices mentioned, changes them into grape sugar. Reflecting on this difficulty, I asked myself if sulphurous acid used with a powerful base, such as potash, soda, or lime, would still present this obstacle. I found, in reality, that the base absorbing the sulphuric acid as soon as formed, left the sugar intact. From this point I was led to make many experiments, easy to reproduce, useless to repeat in detail, and which I will sum up in a few words.

"Dissolved sulphurous acid, added to a solution of the juice of sugar cane or beets, prevents fermentation, but destroys slowly the sugar, if left cold in contact with the air. If heated the destruction is much more rapid.

"The neutral sulphites of potash, of soda, and of lime, do not prevent fermentation; but do not injure the sugar, whether cold or warm. Neither of these products then, would serve.

"The acid sulphites, and more especially the sulphite of lime, presented, on the contrary, properties worthy of interest.

"Sulphurous acid in excess, prevents all fermentation. The base which all these salts contain neutralizes the sulphuric acid as fast as it is formed. It remains to be seen if by themselves, or by their excess of sulphurous acid, they have or not the power to convert cane sugar into grape sugar.

"I have heated for several hours small quantities of sugar candy, dissolved in water, with a large quantity of bisulphite of lime. The sugar was changed. It became uncrystallizable and deliquescent. The syrup thus formed presented sometimes an appearance with which manufacturers of sugar are well acquainted. Submitted to the action of heat for evaporation, it remained motionless. There was therefore the proper quantity to find out, and much care to be taken; but as it takes a great deal of the bisulphite of lime to destroy fermentation, I thought this agent worthy of a closer examination.

"Sugar candy in cold water, charged with bisulphite of lime, even in excess, crystallizes without loss, and without change, by spontaneous evaporation, at a very low heat. It is therefore, possible to manufacture sugar without artificial heat. Further on the importance of this remark will be made manifest.

"Perfectly white sugar candy being dissolved in ten times its weight of water, I added half its weight of a solution of bisulphite of lime, marking ten degrees of the areometer of Baumé, and boiled it for about an hour. It was then filtered, to clear it of the neutral sulphate which was deposited. It was afterwards put into a plate, where it crystallized entirely without a trace of molasses, leaving precipitated, however, a small quantity of the tartrate of copper, which had been dissolved in the potash.

"Straw colored sugar candy treated in the same way, gives the same result, only that the crystals are lighter colored than the candy itself.

"The same experiment with all kinds of sugar produced the same results, whether the liquid when evaporated was left acid, or had been carefully neutralized after boiling. I found also, that the crystallization was as perfect and rapid when the liquid was left unfiltered, as when it was filtered before the evaporation.

"I have examined with a polarizing apparatus, following the method of Mr. Clerget, the sugars that were produced by these different treatments, and I found—

"First. That the crystallized masses gave a direct notation, almost identical with that given after the inversion. The differences sometimes in one sense, sometimes in another, and confounding themselves with the errors of observation, proved that the sugar was not transformed, or that this transformation was practically insignificant.

"Second. That portions of the liquids taken at different stages, before the crystallization was complete, presented to the eye all the qualities of cane sugar, and deviated to the right of the plane of polarization, and gave a direct notation almost identical with that observed after the inversion.

"It results from this, that either after crystallization, or in the syrup before crystallization takes place, no difference is to be found between the sugar dissolved in pure water, and that which has been submitted to the action of the bisulphite of lime, when the excess is not too great of the bisulphite, or the heat too long continued.

"It was then reasonable to suppose that the bisulphite of lime, used as a substance, having a great affinity for oxygen, and as an antiseptic, would have no injurious effect on the sugar, if it was poured cold upon the beet grater, or the sugar cane mill, in such a manner as to mix with the juice, the instant the cells which contain it were broken. It was also to be supposed that it would endure the heat necessary for clarifying without injury. In this operation, judging from experience, the lime employed would neutralize the sulphurous acid, leaving the juice purified from the fermenting matters, and prepared for evaporation, without loss of sugar. But I soon found that the bisulphite of lime possessed certain qualities which demanded further attention.

"White of egg, blood, the yolk of the egg in emulsion, milk mixed with water, when mingled with the bisulphite of lime, and entirely coagulated at a temperature of 100°, (centigrade:) These liquids filtered and subjected to evaporation, leave residuums, in which are found a small quantity of azotised matters, mixed with sugar of milk, or the salts of these substances.

"To its antiseptic qualities, and its faculty for absorbing oxygen, the bisulphite of lime joins very great powers of clarification. This gave me the idea of the following experiments:

"I mixed 50 grammes of sugar candy, 250 centimetres cubes of milk,* 250 centimetres cubes of water, and 50 centimetres cubes of a solution of bisulphite of lime, at 10° of the areometer of Baumé. I boiled and filtered to separate the parts that were coagulated. The concentrated liquid gave a mass perfectly crystallized, which examined without drying or purifying, gave 92 per cent. of sugar, by direct notation, and 93.5 after inversion by chlorohydric acid.

"The defecation was easy and complete. The sugar was preserved intact. The water adhering to the crystals, and the salt of milk found in the mass, explain why there was only 92 per cent. of sugar in the 100.

"I employed in another experiment 50 grammes of sugar candy, half of an

*Cubic centimetres.

egg, white and yolk mixed, 25 centimetres cubes of milk, 75 centimetres cubes of solution of bisulphite of lime, and 450 centimetres cubes of water. This mixture boiled and filtered, gave a liquid which crystallized without molasses. The polarizing apparatus gave 85 per cent. of sugar by direct notation, and 86 after the inversion. There was then only the cane sugar, and 13.100 composed of hygrometric water, the excess of the bisulphite of lime, the salts of milk, &c.

"The bisulphite of lime at 100° (centigrade,) acts as a defecator. It separates the albumen, the caseum, and as will be seen hereafter the azotised matters analogous, which exist naturally in the cane and the beet. This separation is effected without loss or change in the sugar, except that which may be estimated at 2.100 of the mass, of which no account can be taken in experiments of this nature.

"It remains at present to be seen what part the bisulphite plays in preventing the colorization of the syrup.

"The coloring matter of cane or beet syrup comes from four principal causes:—

"First. The substances containing the coloring matters which are dissolved in the juice.

"Second. The contact of the air and the pulp creates rapidly coloring matters, which are added to the preceding.

"Third. The heat employed in the evaporation in changing the character of part of the sugar, and the other substances connected with it, forms also coloring matter.

"Fourth. The air, the lime, and the ammonia, aided by heat, give rise, during the evaporation of the juice, alkalized by the lime, to coloring matter.

"The bisulphite of lime carries away, almost immediately, the coloring matter which exists in the cane and the beet. It prevents the formation of others during the process of manufacture, and especially of those which require to form them, the action of the air and a free alkali. The bleaching power of the bisulphite of lime, with regard to the original coloring matters contained in the cane and the beet, is not absolute. It appears to act by a colorless combination which is formed between these substances and the sulphurous acid. This effect is well known to chemists. When there is a sufficient quantity of green matter to be seen in the stems or roots treated, we frequently see the syrup, after losing its color under the action of the bisulphite, become slightly tinged again as it concentrates, and again colorless when longer subjected to heat.

"In preventing the coloring of the pulp the bisulphite of lime is wonderfully efficacious, and so durable that too much cannot be said of its power. I have kept for six months, in badly covered vessels, the pulp of beets, which remained colorless from the effect of the bisulphite, when it is well known that under ordinary circumstances, they would have become very brown from the action of the air.

"I do not hesitate to say that there are many cases where the bisulphite might be most efficaciously employed to prevent the formation of coloring matter, which gives so much trouble to destroy when once formed; such as those that stain the filaments of hemp or of flax, after steeping, and indigo after it is precipitated, bark juice employed in tanning, the extracts of certain dye woods, &c. But all these points will be examined hereafter. For the moment I content myself with the statement I made above, that coloring mat-

ters that are spontaneously produced without heat in the pulp exposed to the air, never make their appearance when the bisulphite of lime is used.

"I will add that the evaporation without artificial heat: 1st, of a liquid formed by dissolving in water cane sugar; 2d, of cane syrup, and 3d, of beet juice, there will be no color where the bisulphite is used, and that where artificial heat is used for evaporation the coloring is scarcely perceptible. Nay, more, that the sugar obtained by this process from red beets, is completely colorless.

"I have never observed perceptible discoloration, except in rare instances, and even then it was so slight as to be of no consequence in the manufacturing of a large quantity.

"It is thus proved that the bisulphite of lime may be used with success in the extraction of sugar from cane or beets:

"First. As a powerful antiseptic, preventing the production or action of fermenting matter.

"Second. As, from its affinity for oxygen, capable of preventing the changes which the presence of that agent causes in the juice.

"Third. As an agent which at 100° (centigrade) defecates the juice, and removes from it all the albumen and coagulated matter.*

"Fourth. As carrying away the pre-existing discoloration.

"Fifth. As an agent capable, in the highest degree, of preventing the formation of coloring matters.

"Sixth. As capable of neutralizing all the hurtful acids which may exist or be formed in the juice, substituting for them an acid almost inert, (sulphurous acid.)

"It remains to be seen under what form or in what quantity the bisulphite of lime should be applied to the cane or beets; what new facts may be discovered in manufacturing a large quantity; and what inconveniences may overbalance the advantages it seems to offer. This is what I now intend to examine, arguing from my own experience, without exaggeration, but also without timidity.

"One of the thoughts which has the most sustained and excited me in the course of my researches, was the hope that, in the equatorial regions at least, sugar might be extracted by the heat of the sun alone. What would prevent that, once preserved from change, the juice of the sugar cane should be abandoned to slow crystallization in the open air, like salt in the salt marshes? I should say there was no obstacle, and I call to witness all those who have seen my experiments. They have all been of the same opinion. This opinion and this desire will explain why the experiments I am going to state have received the direction I have given them.

"It is well known that there exists in Murcia manufactories for making sugar from cane. They have resisted all the vicissitudes that the commerce of sugar has experienced for sixty years, and are still in full activity. It is from these manufactories that a friend procured me some hundred pounds of fresh sugar canes for my experiments.

"They reached the laboratory of the Sorbonne, in Paris, where I made my experiments, in a good state. They were pronounced by persons who had been in the colonies, and were acquainted with the subject, to have been im-

* There remains, however, after this clarification, a matter which is colored by the air, or the influence of an alkali, first violet and afterwards brown. It is probable that it is an azotized substance.

perfectly ripened. A good many were worm-eaten. My experiments, then, from such materials, could not be expected to be very satisfactory; nevertheless, the first essay I made filled with astonishment persons accustomed to the manufacturing of sugar, and capable of judging the results obtained.

"The juice was extracted by a coarse grater, adding bisulphite of lime during the operation. It was clarified by boiling, and simply filtered through a cloth strainer. The concentrated syrup was filtered a second time, and left to crystallize slowly. This it did to almost perfect dryness. An analysis by by alcohol could have given nothing better, either in quantity or quality. It was even more colorless than sugar obtained by alcohol.

"In these experiments all the sugar contained in the juice took a solid and crystallized form. The crystals were large and firm. They were not more colored than ordinary sugar-candy, which they resembled in appearance. The traces of molasses were almost imperceptible.

"Taking into consideration the almost entire purity of the juice of the sugar cane, which really once clarified, is only sugar and water, and considering also the aptitude which cane sugar has to form large crystals, in which quality it is far superior to beet sugar, I am sure that the first colonist who attempts to evaporate slowly a quantity of syrup will perceive that the crystals, in size, color and appearance, are so superior that the advantages of the process will be entirely evident to his mind.

"I changed the proportions of the bisulphite of lime; I experimented separately on the ripest canes, on the greenest, and on the worm-eaten, and in all my essays the result was the production of crystallized sugar. I never found a spoonful of molasses that could not be crystallized.

"The analysis of the juice and the action of the bisulphite on it were always the same, both as regards the substances contained and the quantity of sugar obtained.

"The operation is so simple and so correct in its results that it appears almost necessary to do wrong expressly in order to fail to extract all the juice from the sugar cane.

"Every one knows that the juice extracted from the sugar cane is sometimes not more than the half, never more than two-thirds of the quantity really contained in the cane. There remains, then, in the crushed cane at least a third of the saccharine matter. To extract this by washing, in warm climates, is impossible, on account of the rapidity with which fermentation takes place; but if the bisulphite of lime is mixed in the water used in washing, nothing is easier. There is no need for hurry, and the washing may be so perfect as to extract the last particle of sugar.

"Thus obtained, these washings would be nearly as rich as the juice itself. Treated in the same manner, by defecation, at 100° (centigrade) simple filtration and concentration into syrup, and then slow evaporation, they would give the same results as the juice.

"I tried, with the crushed cane, this method with a lively curiosity, and I succeeded in producing large crystals of pure sugar and much superior in color to the best sugar sent us from the colonies.

"Even more, and that for reasons that chemists had already discovered, the skimmings and the filters employed in filtration, after several days' exposure to the air, and the danger of fermentation, yielded pure crystallized sugar. It was only necessary to wash all these substances in water charged with the *bisulphite* of lime, and evaporate this water.

"Thus the bisulphite of lime rendered the sugar almost as unalterable as mineral salt; that of the juice, the crushed cane, the scum, and the filters, produced the same large grains of a colorless or slightly yellow candy. All this requires neither care nor study, and nothing renders hurry necessary. As long as the bisulphite exists in the smallest appreciable quantity in the liquid it prevents all alteration.

"I know nothing of the colonies, and it would not, therefore, become me to pronounce if the employment of such a process would or would not have the effect of producing division of property, by enabling the negroes who inhabit them to extract the sugar profitably on a small scale; but I do not hesitate to say that my essays proved that this change in the cultivation and in property is possible.

"It may be objected that powerful mills are necessary to crush the cane. This is not so. A root-cutter and a grater are all that is necessary; because the washing is so complete by the employment of the bisulphite of lime, that all the juice may be extracted in that way from the cane, cut or torn in the rudest manner. However that may be, I will now give the method I arrived at, treating the canes which I had sent to me:

"1. I broke up the canes by means of a beet-grater, watering the pulp during the operation with a solution of the bisulphite of lime. I then pressed out the juice, which was boiled, filtered, and evaporated by fire to the density of about one-third what the cold syrup should be, filtered again, and left to slow crystallization. This gave me in a few days a mass of candy, from which it was impossible to extract any molasses.

"2. The crushed cane or pulp, whichever it may be called, was wet with water, submitted to another pressure, which produced another juice less rich. This, treated like the first, gave the same results.

"3. I repeated again this last operation.

"For all these experiments I employed one per cent. of the weight of the cane of a solution of the bisulphite of lime, at 10° areometer Baumé. I took out the whole of the sugar, and found all of it in a solid form. My operations, though evidently susceptible of being applied to manufacturing on a large scale, presented at the same time a perfect analysis of sugar cane.

"If experienced chemists, who, like Mr. Caraseca, in Havana, and Mr. Arequin, in Louisiana, are in reach of sugar manufactories, will repeat my experiments on a larger scale, I am sure their opinion will be soon formed.

"I will now mention the objection to my process. The sugar obtained by it has a taste of sulphur, but it loses this in three manners:

"1. Crushed and exposed to the air, the sulphite becomes neutral sulphate.*

"2. Exposed to an ammoniacal atmosphere, the sugar loses its sulphurous flavor, and often takes a taste of vanilla very agreeable; but it is sometimes slightly colored.

"3. Clayed, so as to lose about ten per cent. of its weight, it gives a sugar equal to the purest and whitest sugars of commerce.

"The syrup used in claying may be regenerated by evaporation, and gives crystals similar to the others. For manufacturing I recommend the third process.

* As crystallized sugar does not contain solid bisulphite, but only neutral sulphite, this can only give neutral sulphate. If the sugar is acid, this acidity is derived from the acid phosphate of lime formed by the action of sulphurous acid and the phosphate of lime in the juice.

"I will only, for the moment, slightly mention a circumstance that may cause difficulty. The sulphates and the sulphites are changed by the contact of organic matter into sulphurets. The formation of sulphurets, and the appearance of free sulphur, which would probably be the consequence, are not presented in any of the numerous specimens which I possess, and of which some of beet sugar are already quite old.

"I recapitulate: 100 kilogrammes of cane contain about 18 kilogrammes of sugar, when in good condition. They yield 60 kilogrammes of juice when well managed, and this gives 12 kilogrammes of sugar.

"There is usually extracted from the juice from 6 to 7 kilogrammes of unrefined sugar; there is, therefore, a loss of 5 or 6 kilogrammes in the operation; besides which 6 kilogrammes are left in the crushed cane.

"It results from this, that by applying the new process to the juice alone, 12 kilogrammes of refined sugar will be obtained, in place of 6 or 7 kilogrammes of unrefined sugar. If the crushed canes are also submitted to this process, 17 or 18 kilogrammes of sugar will be obtained from 100 kilogrammes of cane; that is to say, the whole amount of saccharine matter contained in the cane may be extracted. In saying, therefore, that the yield of sugar from cane might be doubled, I stated nothing in which my experiments did not bear me out, and certainly was far from exaggerating.

"The future will decide. I await its judgment with the most perfect confidence. The bisulphite of lime will enable the manufacturer to do all which the chemist can do with alcohol; and if the latter extracts 18 kilogrammes, the former will also do the same one of these days.

"Whether the evaporation should be carried on to the end by boiling; whether the syrup should be concentrated one-third and finished in the drying room; or whether the evaporation should be entirely carried on in cases exposed to the sun, is more than I am able to decide. Local circumstances and studies on the spot will determine this. I will only remark that the use of the bisulphite, by preventing fermentation, renders the use of large shallow cases or reservoirs of wood easy, and permits even rooms of graduated heat for drying.

"I did not have at my disposal a sufficient quantity of juice to try these different methods, but I desire to show that they are worthy of essay; and I recommend to the attention of Mr. Casaseca, or any other chemist in a favorable position for trying it, the following experiment:

"I took beet juice, to which I added four per cent. of the normal solution of bisulphite of lime. Having clarified it, I put it into a pine case, which I had previously washed well with the bisulphite. The bottom was pierced with holes, each of which had a string passed through it, which hung down, and thus afforded numerous means for the juice to run off, and a large surface for evaporation. As fast as the juice was collected in a vase placed under the strings, it was poured over again, and thus concentrated by passing several times; the syrup was placed in a flat vessel, where it crystallized almost entirely. In the little molasses which was separated from the crystals new crystals were formed, and these last were as perfectly characterized as the first.

"If, with beet juice and an imperfect apparatus, this experiment succeeded, why should it not with cane juice, which is purer and richer, in hotter countries, in the open air, and with a more carefully arranged apparatus? *Why not* seek in the heat of the sun, where it is so intense and so certain, *the means* of replacing coal and other combustibles which are not to be had?

"Whatever may be the means of evaporation which experience may prove to be the best, the striking results obtained in operating on a few hundred pounds of cane, has convinced me that the extraction of sugar in the colonies will hereafter follow new and more profitable methods. The juice and crushed cane being placed out of the reach of fermentation, I was, therefore, fully disposed to take immediately, the measures necessary to ensure a prompt essay of my system. This I hope to do (with the aid of Mr. de Tracy, Minister of the Marine in France, who has shown me much kindness,) either in the French colonies or in Algiers, where many well-informed persons think that the sugar cane would succeed perfectly, and where the greater quantity of sugar given by my method, would enable them to produce, at a low price, sugar which, from its favorable position, would command the market of the Mediterranean."

Paper Veneering.—A process of covering plain furniture, trunks, boxes, &c., has been patented, by which common and cheap woods, and cheap work may be covered by a prepared paper stained of the proper tint, for mahogany and other kinds of wood desired to be imitated. The veneer is then to be well varnished.

The advantages of the invention are, that it is cheap, easily prepared, and can be readily repaired if defaced. It also gives a fine finish to a common and plain piece of work.

Lubricating Compounds.—Three patents have been granted for compounds designed to diminish friction in running gear, as applicable to axles of rail-road cars, and other machinery.

One of these is for a process of preparing the composition, and the other two for the ingredients used. The ostensible object in most of the compounds used for these purposes, is to obtain a material that will not melt, except as the machinery becomes heated by the friction, and then even, that it may have sufficient absorptive substance to hold in contact with the friction surface, a sufficient quantity of the lubricating material, rendered fluid by the heat. The absorptive materials used, are plumbago, french chalk, magnesia, soapstone, clayey matters, &c.

Manufacture of Pearlash.—This is claimed as an improved process, on the ground that the inventor, by first roasting the ashes, and thus burning out all the combustible matter usually found mingled with them, such as bits of wood and charcoal, he then makes one solution and one evaporation, and the work is done.

Printer's Ink.—An application for the composition of a printing ink has been admitted to be the proper subject of letters patent, but in consequence of a legal question arising out of an interference between two inventors, the patent could not be issued till after the close of the year, still, as the invention is regarded as an important one, some account of it is deemed proper in this place.

Linseed oil and lampblack are the well known ingredients of printer's ink, and the preparation is necessarily attended with a tedious, disagreeable, and dangerous process of boiling and burning, in order to give the ink the peculiar tenacity required.

The invention here set forth consists in the introduction of a new oil, not before used for such purposes, and thus modifying the process, so as to obtain an ink of superior quality, without the dangerous process of burning.

Considering the large amount of this material used at the present day, and the comparative cost of the two oils, (the expense of the linseed being four times that of the rosin oil,) this invention assumes an importance in the ma-

provements of the day, not usually met with. It is also stated that the introduction of this oil enables the printer to print with delicate and fancy colors, which cannot be done with ink manufactured from linseed oil.

The oil here referred to, and called *rosin oil*, is obtained by the destructive distillation of common rosin. The process was patented some five or six years ago, by W. T. Clough. This oil is extensively used in paints, and has been recently introduced for the manufacture of illuminating gas. It is this oil which furnishes the gas to light our streets, houses, and the public buildings of this city.

Distilling Liquors.—Although three patents have been granted under this head, only one of them requires any special remarks. This consists in an arrangement of a still of ordinary construction, so that by the enlarging and elevating of the head into a cylinder, a series, or several tiers of cups or pan shaped vessels, capable of containing charcoal or other purifying materials, may be placed one above another, within the cylinder. These purifying pans are pierced with holes in their bottoms for admitting through them the impure spirituous material, which is purified by passing through the charcoal contained therein, and it is converted into pure spirits by the single operation. There are other details of minor importance about the apparatus, which need not be named here.

A process of preparing Metal Patterns for Casting.—A process has been patented for reducing and working into the desired shape and form iron castings to be used as patterns for moulding for other castings. It consists in acting upon the cast metal with dilute oil of vitriol, until the metal of the exterior parts is nearly all dissolved out, and thus presenting a substance chiefly plumbago, easily worked with tools, and which may be planed and worked into the proper shape, while the internal parts retain a sufficiency of metal to give strength to the whole.

A process of coating Iron with Copper.—This consists mainly in the device for protecting the iron while it is being immersed in the melted copper.

The iron having been cleaned and prepared in the usual manner, with dilute oil of vitriol, is quickly dried and immersed in a thick cream of clay and water, and again quickly dried, and with the covering of clay upon it suddenly depressed in the bath of melted copper, by which the clay flies off, and the metals firmly combine. A coated iron plate is thus formed, that is susceptible of many and valuable purposes in the arts.

Curing the Stems of Tobacco.—This is a process by which an article hitherto regarded as a useless material, is made to subserve a valuable purpose. It consists mainly in digesting the article for a certain length of time, having previously mixed it very thoroughly with pulverized charcoal. Some other details of the process are necessary, which need not be here stated.

Process for Generating Illuminating Gas.—The peculiarity of this invention consists in the use of a mixture of charcoal and iron scraps, heated to bright redness in an iron retort, through which pass the gases generated by passing steam through red hot charcoal. It is proper to say that when steam is passed through highly heated charcoal, the oxygen of the water unites with a part of the carbon and forms carbonic oxide, while the hydrogen unites with more carbon and forms light carburetted hydrogen. Both of these gases are combustible, but neither furnishes any considerable illuminating power. But it is alleged by the inventor that when these gases, and especially the hydrogen, is brought into contact with carbon and iron at a red heat, the light carburetted hydrogen is converted into olefiant gas, or heavy carburetted hydrogen.

It is now about twenty years since apparatus was constructed for the preparation of illuminating gas, from decomposed water mixed with other hydrocarbons. The first attempt was by mingling spirits of turpentine with the gases derived from water at the burner. See the English patent of Michael Donovan, sealed 6th October, 1830.

The next step in the improvement consisted in the mixture of the gases from the decomposition of water, with volatile oils while on their way to the burner. The oils were thrown into the pipes in the state of vapor. This improvement made by Jean Baptiste Mollerat, was set forth by the inventor in a patent sealed in England 25th September, 1834.

The same gentleman made another modification of his apparatus, as shown in his second patent sealed May 2nd, 1837, in which it is stated that the gist of the invention consists in bringing the gases generated from steam into contact with the volatile products of oil at a high temperature.

In 1840 Count de Val Marino exhibited in England a further improvement in gas generators, a patent for which was sealed 22nd June, 1839.

It consisted of three cylindrical iron retorts, standing on end in a row in the furnace. In the first it was alleged that the steam was decomposed into carburetted hydrogen and carbonic oxide; in the 2nd the gases were more highly carbonized, and in the third, brought into contact with the volatile oils, when in the act of being converted into gases.

In the first retort are placed sufficient carbonaceous material to decompose the steam; in the second are contained pulverized charcoal and other carbonaceous matter, to more highly carbonize the gas; and in the third, fragments of coke or other carbonaceous matter, amongst which the gases from the second retort are received, and on which the oil or other gas making liquid is allowed to fall in drops or fine streams. Such was the state of progress in this department of the arts, when the invention now under consideration was presented for a patent in England, and was sealed April 15th, 1847.

Mr. Stephen White the patentee, also employed the three retorts used by Val Marino, but confined himself to the use of two for decomposing the steam and carbonizing the gases from it. In the first two he placed abundance of carbon, consisting of pulverized charcoal mixed up with scraps of iron or iron turnings, for the purpose of rendering the gas more highly charged with carbon. The substance of the invention in this case consists in adding the iron turnings to the carbon in the first two retorts.

The claim in the English patent above referred to covered many points not material to the main feature of the improvement, which consisted in the use of iron fragments contained in a colander placed in the middle of the retort, or the use of lime in place of the iron. In the American patent of Mr. White, granted January 22d, 1850, on the English patent sealed 26th March, 1849, the claim is based upon the use of the iron in combination with the carbon.

In reviewing the subject of the processes and materials for generating illuminating gas, where the elements of water are brought into contact with highly heated pulverized carbon, and as appears by the results made to absorb a considerable amount of carbon, so as to give them a luminous body, so to speak, there seems to be a great dearth of definite information. Nearly all the persons who have been engaged in improving the processes and the apparatus do not appear to understand the precise nature or the desiderata of their experiments. Mr. White says, in his specification of his English patent for 1847, that the effect of his iron plates, used with the carbon, is to absorb the carbonic acid gas generated in the gas evolved from steam. I have

recently repeated the experiments of Mr. White, and have been enabled to prove that no carbonic acid does or can exist where the elements of water, or where oxygen, or air, or carbonic acid are allowed to pass through or over pulverized carbon at a red heat; any of these elements, except the carburetted hydrogen, will be instantaneously converted into carbonic oxide.

From what has been done by my own and others' experiments, I have learned the following: that whenever light carburetted hydrogen, or pure hydrogen, or carbonic oxide gases, either separate or mixed with each other, are passed over highly heated pulverized charcoal, a great excess of carbon is taken up and rendered volatile and held in combination with the gases, communicating to them a considerable degree of illuminating power; but the quantity of carbon taken up depends on the degree of heat and on the surface of carbon presented, so that it is a difficult matter to so gauge the quantity of carbon taken up as to produce a uniform and equable light. It is found that when any of these gases has been charged to excess with carbon, if it be passed over or through iron chips or fragments heated to moderate redness, the metal will take up the excess of carbon, and yield a fair illuminating gas of a pretty uniform composition, and this, mingled with the ordinary oil or rosin gas, constitutes the basis of all the processes now before the public for water gas.

Mr. White used the carbon and the iron in the same retort; others use the materials in two different retorts, and force the gases first into the carbon retort and then into that containing iron.

Concentrated Animal Manure.—A patent with this title has been ordered to issue. But from delay in amendment of the claims it will not be published in the list of 1849. Its importance however, embodying as it is believed, facts and principles not hitherto generally known, demands some notice from your examiner.

To express a principal feature of the invention in few words; the inventor exposes the flesh of animals to the action of sulphuric acid of certain strength, by which it assumes a fixed state or condition in which it may be kept for any length of time, without undergoing any further change. In this state the animal matter may be preserved for transportation, for manure, or for manufacture of ammoniacal salts, as we shall see further on.

The inventor in his description says, "my invention has for its object the production of a concentrated manure, with nitrogen as an aliment, to be used as a substitute for guano.

"In the preparation, I make use of such organic substances as whenever employed for manures at all, have been attended with the production of much nauseous effluvia, and the loss of a great part of their substance by the escape of the gases envolved, and especially ammonia.

"Besides producing a valuable manure from the offals of slaughter houses, fisheries, manufactories for extracting oil from fish or flesh, &c., the invention is intended to convert to a useful application such animal matters as do not ordinarily constitute the food of man; as the flesh of horses, mules, dogs, rapaceous beasts, birds and fishes. The carcases of porpoises, sharks, dog-fish, white fish and many others, are frequently thrown upon land as manure, either before or after, the extraction of the oil. But this can only be done when the transportation is for a short distance only.

"For want of suitable means of preventing putrefaction and reducing the bulk and weight, to diminish expense of transportation, the use of the materials has been always confined to narrow limits. And the noxious and offen-

sive gases which always accompanying decomposing animal matter renders such materials nuisances to the neighborhood where they are found.

"Highly nitrogenized vegetable matter may also be treated in the same manner, and used for the same purposes.

"*Process.*—Putrefiable organic matter containg nitrogen, are subjected to the action of concentrated sulphuric acid, or are mingled with various sulphates, nitrates or clorides, and especially the sulphates of iron, lime, soda or potash, or with the nitrates of potash or of soda. The proportions used are such as to keep the weight of the acid, whether free or combined, when compared with that of the animal matter, from one-fifth to one-tenth of the latter. The weight of acid, whether in a free or combined state, to that of the animal matter, is from one-fifth to one-tenth of the latter. The acid or salt, acting as an antiseptic, secures the animal matter from decomposition. If the acid be free, or be held to its base by feeble affinity, as in the sulphate of iron, it secures the azotous portion of the organic matter from being food for worms, or flying off with hydrogen in the state of ammonia.

"Among the antiseptics employed is a mixture of sulphuric acid and nitrate of soda, and dry tan or saw dust; the first two ingredients being allowed to react before the addition of the ligneous matter. Besides preventing or arresting putrefaction, another property is secured in the use of the acids, salts, &c., the fixing of the fertilizing products of the organic materials treated, even when subjected to the temperature required to evaporate the water. This property allows the materials to be quickly dried without injury, and to be reduced in weight and bulk, and made susceptible of transportation with moderate expense.

"If the manure is to be long kept, or transported to considerable distances, after treatment by acids, &c., as set forth, I subject the organic matter to a process of desiccation by means of a boiler, oven, drying room or kiln, to vaporize the water, which renders them lighter and friable, and thus presents to the public a material in a suitable state for sowing or spreading on land, like guano, or any pulverulent matter.

"In order to facilitate the union between the organic matter treated, and the acids and other agents employed, I use the acid in a concentrated state, in which the flesh, &c., is boiled. In this way the azote or nitrogen is arrested, and the aqueous particles escape.

"From this treatment of the materials a gelatinous mass is obtained, which is mingled with pulverulent matter either neutral, or it may be, an active fertilizer, according to circumstances, such as bone dust, ground plaster, spent bone-black, coal ashes, road dust, spent tan, powdered charcoal, &c.

"During the formation and mixing of pulverulent matter, while in the jelly or paste state, coal tar, wood tar or petroleum, pitch or rosin are added to correct fœtid effluvia, in case any should be evolved during the operation.

"When no actual putridity exists in the organic matter to be converted into manure, quick lime or lime that has been used in purifying coal gas, is sometimes used to effect the desiccation of such materials, and the mass is then formed into bricks or dumplings, for the purpose of convenience of transportation, and these may be pulverized or broken into fragments, for the purpose of distribution over the soil.

"But whenever putrefaction has commenced, the lime cannot be used, as by abstracting water it would cause the evolution of ammonia, and great loss of material be sustained.

"The inventor claims the use of mineral acids to act on the soft parts of

animals, or upon azotous vegetable matter, at temperatures varying according to circumstances, as herein set forth.

"Also the combination of the acids with the different salts, as described, to modify the action of the acids.

"Also the combination of the acids with wood, tar, &c., as set forth."

LEATHER.

On this subject have been granted twenty-one patents.

For Boots and Shoes	7
Tanning and Finishing Leather	5
Saddles and Harness	9

Boots and Shoes.—A patent has been granted under this head, for a combination of devices for cutting boot heels. It consists of an inclined plane or bed piece, and two curved cutters or chisels, for cutting the two symmetrical sides, and half of the back. The cutters work in guides with machinery to depress them, so that the heel or several lifts may be cut at a single depression of the chisels. The guides are so arranged that as the chisels descend they expand or separate and produce the expanding form of the heel, from the bottom upward.

A patent was also granted for a metallic spring boot heel of the usual contour and form. It consists of an outer case or ring of metal, and of a corresponding piece received within it, and easily sliding in and out; but when in its proper position, projecting beyond the case. It is sustained in its place by means of a spiral spring under the central portion of the cap. Perhaps a clearer idea may be obtained from the claim, which is, "making a metallic tread for the heels of boots and shoes, separate from, but secured within the casing of the heel, in such a manner that it shall be free to change its position, to accommodate itself to the inequalities of the surface of the ground, whereby it wears more evenly, and is less fatiguing to the foot than a rigid heel."

Tanning.—A patent has been granted for a modified process in tanning leather, which is specially applicable to light skins, but may be used in all kinds of tanning.

The gist of the invention consists first, in a modified process of unhairing the skins, by a composition of lime, potash and salt, by which the process is very much shortened; and secondly, by combining what is called the process of *plumping* with that of *tanning*. It is alleged by the patentee that the process of plumping, which consists in the use of acids, to open the pores of the skins, is like that of rising dough by yeast; namely, that after the pores have once been fairly opened, if the tanning process is not commenced immediately, they will soon begin to close; as dough once raised, if not transferred at the proper time to the oven to be baked, will fall, and an inferior bread will be the result.

The process of tanning therefore, as set forth by the inventor, consists in the combination of the plumping and the tanning process, so that as soon as the acids have acted to open the pores of the skins, the tanin present in the liquor, shall enter and perform its part in the operation.

Saddle and Harness.—A buckle designed for light service, as suspenders, has been patented. Every part of it is formed by dies, which strike it up from a plate of metal. The usual open parts are cut out, and the tongues, which are two or three, project forward to the cross bar, but do not lap upon it, for then they could not have been cut out of a single piece of metal.

After the first blow of the dies has been struck, the buckle is removed, and the points which are to form the tongue, are slipped under a second or finishing die, by which they are elongated at a single stroke, and the buckle is completed. Thus by two successive strokes of dies a buckle is formed.

HOUSEHOLD FURNITURE.

In this class there have been granted fifty-five patents, arranged in the following groups:

Washing machines	6
Cutters of meat and vegetables	7
Bedsteads and fastenings	19
Tables	6
Chairs	7
Brushes, &c.	4
Cream freezers	3
Bottle cleaners	1
Portable water-closet	1
Mosquito bar	1

Washing Machines.—In relation to this group of patents it is necessary only to say that the subject is so nearly exhausted that, so far as new devices for agitating the materials are concerned, there seems little room for invention. Every contrivance for creating friction seems to have been applied to these machines; the principles adapted to churning, fire engines, water wheels, fulling mills, rolling and smoothing grounds, rolling and smoothing shot, have been made to contribute to this necessary household operation. It is believed, however, that there is no striking feature in this group requiring special notice.

Cutters of Meat, &c.—This group embraces the different machines for preparing and stuffing sausages, paring, quartering and slicing apples, and cutting vegetables for feeding domestic animals.

A patent was granted for a small and very simple apparatus to grind the meat and simultaneously press it into the cases prepared to receive it, at a single operation.

The machine consists of a small conoid mill or vessel somewhat resembling a coffee mill, but lying on its side. It has a solid conoid piece or runner within, having a spirally-fluted surface, and corresponding projections on the concave portion, each designed for cutting and pushing forward to the apex of the cone the comminuted material. The hopper placed on the upper side of the cone receives the pieces of meat of suitable size. A crank is fitted to the extremity of the runner at the large end of the cone, and the body of the machine is made fast to a table and worked like a coffee mill. The case is slipped upon the tube of the small end of the cone, and as the crank is turned the meat is comminuted and pushed forward, and the case is slipped off from the tube as it is filled.

A machine has been patented for paring, coring, and slicing apples, at three several steps of the machine. The machine is in the main constructed like an ordinary paring machine; the apple is placed by hand upon a tridental fork, and against it rests the knife, which, as the machine is turned, moves forward from the stem towards the apex, without any external aid. At this end of the first step of the operation, in order that the knife may move back to the stem to take its place anew for another operation, a weight

on this side of the knife haft, which had been carried up a quadrant of a circle by a segment wheel meshing into a bevel wheel, (which last is on the driving wheel,) the said bevel wheel having a space bare of cogs, and as soon as the cogs of the segment wheel reach the bare space in the bevel wheel, the weight rotates through the quarter of the circle, and the knife is thus carried back to the base or stem of the apple. At this stage of the operation, a slide block, working in horizontal guides, carrying a tube of thin sheet metal, and which was placed opposite to and pointing towards the apex of the apple, is now pushed forward by a motion of the hand, and pierces the apple from the apex to the stem, thus taking out the core, and as the block returns to its first position, takes the apple from the fork; but before it reaches its position the apple strikes against a projection which releases it from the coring tube and allows it to fall upon the hopper-formed base of the machine, where it meets with a series of rotary horizontal knives, moved by gearing from the driving wheel, which knives cut the apple into pieces of uniform thickness suitable for drying.

Bedsteads and Fastenings.—Although nine patents have been granted for bedstead fastenings, scarcely any of them presents a radically new feature, and this part of the group will be passed over without further remark.

A portable cot-bedstead has been patented, designed to be used as a camp bedstead. It is of simple and cheap construction. It has the usual form of the cot-bedstead, but is so constructed as to have every joint severed in a few seconds, and the whole rolled into a compact roll, like a map or chart.

An iron bedstead, made to fold together with a kind of double joint, has been patented during the year. The joint is so constructed as to admit of the bedstead being folded together midway of the length of it; so that when folded it is converted into a clothes horse, and may stand close by the side of the room, or in a closet, when out of use.

The folding is performed thus: two joints, each with a link piece midway of the length of the side rails, admit of the middle of the bedstead being elevated to form the top of the stand. The head piece and the foot piece would, if practicable, rest flat upon the floor, but there is a joint both at the head and foot piece, which permits each part to fold down upon the outer surface of the bed; so that when the whole frame is folded together as a clothes horse, the four legs of the bedstead form the four legs of the clothes horse.

Tables.—A table called a self-waiting table has been patented. It is a round table, the outer portion of which is fixed, and is of sufficient width to accommodate the plates of individuals. The central portion is detached from the outer portion, and elevated a few inches above it, is moved by clock work, and made to rotate slowly, so as to bring every plate or dish on the central portion to each individual at every rotation of the table; and this is frequent enough to allow every one at the table to be amply served without the aid of a waiter.

A dining table for ships' cabins has also been patented during the year. It is constructed on the same general principle that the ship's compass is balanced in the binnacle. A pendulum weight is suspended by a rod from the leaves of the table, so that whenever the ship varies from the upright position, the pendulum, by its weight, tends to a vertical direction, and in the same proportion the table leaves tend to the horizontal direction.

Chairs.—An improved fan rocking chair has been patented during the year. It consists of an ordinary rocking chair, having a rod of metal or wood extending upward from each rear post considerably higher than the head, and

thence bending forward, and at their extremities united by means of a cross bar above and a little anterior to the head. From the cross bar is suspended a curtain with a roller in the bottom, and heavy tassels at each corner. As the person rocks the chair the fan curtain moves and produces an agreeable and cooling effect about the head.

WEARING APPAREL.

In this class have been granted nine patents, under the following heads:

For Tailors' measure	1
Finishing buttons	1
Button making machine	1
Button mould machine	1
Manufacturing bandboxes	1
Machine for curling hat brims	1
Shaving brush	1
Hooks and eyes	1
Dress pin	1

A patent was granted for a shaving brush of the usual form, but containing within, and in the central part, a reservoir for a shaving cream, or semi-fluid soap, which is pressed out as needed by means of a piston governed by screw thread, and a thumb piece projecting out at the top.

Respectfully submitted,

L. D. GALE, *Examiner of Patents.*

Hon. THOMAS EWBANK, *Commissioner of Patents.*

HON. THOMAS EWBANK, *Commissioner of Patents,*

SIR:—In compliance with your request, I have the honor to report, that on the 1st of January, 1850, the Patent Office contained fifteen thousand one hundred and seventeen models, which are classified as follows, viz:—

Of patents issued previous to December, 1836,	200
" " " since " "	6,980
" " for designs	257
" " " additional improvements	92
Whole number of models in the office for patents granted	7,529
Number of models for applications suspended	642
" " " rejected	6,946
Total	15,117

It is to be regretted, that after a lapse of twelve years, but two hundred of the several thousand models burned, have been restored. This, however, cannot be attributed to any neglect upon the part of the Patent Office, but to the fact that previous to 1836, models were not required in all applications for patents made, and also to the failure in patentees to have duplicates made, for the payment of which, ample provision was made by act of Congress. The office should not relax its exertions in continuing to urge the necessity of their restoration, each year adding to the difficulty of their procurement.

The models belonging to patented cases are being classified and arranged,

as far as the inadequate rooms *now* appropriated for their exhibition will admit. Congress having granted the use of the upper part of the Patent Office building temporarily, to the National Institute, and the collection of the South Sea exploring expedition, deprives the office of the use of the room most appropriate for the reception of the models. Unless the collection above referred to be removed, the office will find itself much embarrassed for want of proper facilities for arranging the rapidly increasing number of models.

No provision is at present made for the proper exhibition of the models pertaining to rejected applications. This is much to be deplored, for although in many instances they have been decided to be similar to those already patented, yet, in very many cases, they are rejected upon machines invented in other countries, and which are only found described in their printed books. These books are not accessible to a large number of inventors, consequently they are groping in the dark. The policy of Congress, in the laws passed relating to the Patent Office, indicate a desire that every possible advantage shall be given to inventors to examine everything for which patents have been asked, so that they may not waste their thought, time and means upon that which has been produced before. These facilities cannot be granted as the building is *now* occupied, for want of the proper room in which to arrange these rejected models.

The models now in the Patent Office have cost the inventors, at a moderate calculation, $500,000, and not a few reflect as much credit upon them as specimens of art, as they do upon their ingenuity as beautiful inventions, many of them performing in miniature the most intricate operations of full sized working machines. They should be carefully preserved as evidences of the progress of invention in the United States.

To a foreigner, the model rooms of the United States Patent Office, are a matter of astonishment; he sees at a glance the extent of the inventive genius of our country, whilst at home it is enveloped in rolls of dusty parchment. It should be the pride of Americans to foster and cherish an institution thus reflecting credit upon their ingenuity, and exciting admiration from abroad.

By the act of Congress authorizing the issuing of patents for designs, the applicants are required, when the design asked for will admit, to furnish a model or specimen. In all cases, with very few exceptions, these applications are for designs for the ornamental work upon stoves. In such cases the inventor must, at great expense to himself or the office, send either a whole stove or the plates thus ornamented, and which only fill up the already too crowded rooms with material never referred to by inventors, or by the office, and of no practical benefit whatever. I would respectfully recommend that some provision of law be asked for which will remedy this evil, or at least make it discretionary with the office to decide whether in applications for patents for designs, a specimen shall be required or not.

Owing to the rapid accumulation of models (now occupying eight rooms in the building) and the difficulty of arranging them, your predecessor found it necessary to furnish the machinist with assistance in the discharge of his duties. This assistance is still furnished, and has become necessary for the despatch of business. I would respectfully recommend the propriety of asking for an act of Congress authorizing the appointment of an assistant machinist, who should be regularly qualified by law, as from the nature of his duties he is necessarily more or less privy to the applications in the secret archives of the office.

A. B. STOUGHTON, Machinist.

IV.

ORIGIN AND PROGRESS OF INVENTION.

THE present is thought to be a suitable occasion to submit a few general observations, illustrative and suggestive, on the origin, early development, and future achievements of the Arts, hinderances to their progress, value to society of the classes who cultivate them, &c.; with remarks on THE MOTORS—the great levers of civilization; presuming that such will not be considered an irrelevant introduction to occasional *resumés* of the results of science, which are proposed as features in future reports from this bureau. Facts embodied in summaries of the kind would be of popular interest and permanent value.

The short period intervening between the appointment of the undersigned and the time designated by law for the presentation of this report, in connection with urgent and incessant demands of other official duties, has rendered it impossible to prepare or make arrangements for the preparation of such a document for the present communication.

ADVENT OF THE ARTS.

Man has everywhere made his debût in the character of an Orson. Soon as the curtain rises, behind which there is no peeping, as an untamed animal he leaps upon the stage, and as such goes through the opening act. The annals of all the people of old began with their condition as savages. Those of the Jews form no exception; their earliest progenitors are represented as being at the foot of civilization's ladder, both in arts and morals. Of the present occupants of the earth, the records of the enlightened trace their forefathers to various phases of this same low condition, beyond which a large portion of mankind has not yet advanced; an indication of the infancy of the species.

Man's physical wants first occupied his attention. In the dawn of his being, he was as ignorant of others as his wildest descendants are now. In common with creatures below him, his necessities were his monitors; designed by his Maker to initiate him into habits and awaken impulses that were to become distinguishing traits of his race. He was to be a thinker and worker. All creatures act more or less from reflection, but in him these qualities were to be pre-eminent. He was to live by his ingenuity and labor, according to a law from which no order of beings on our globe is exempt, and most likely on no others.

It is irrational to suppose that happiness of any kind can be realized, except as the reward of efforts to attain it. In this respect, ants and angels are probably alike. Every living thing is furnished with organs adapted to its nature and the theatre of its existence; and on the proper application of these its enjoyments and their augmentation are made to depend. Knowledge comes

not to us by intuition, and the tenderest insect, as well as the mightiest quadruped, perishes, that uses not the means given it to live. All are ordained to preserve life by the diligent employment of their faculties, and all are urged thereto by the most pressing of natural requirements. The spirit of the injunction that man should earn his bread by the sweat of his brow, was therefore nothing new, since it had been imposed as a condition of life and of the enjoyment of life from the beginning. Indeed, it is not conceivable how any of earth's denizens could have been disciplined for the work assigned them, had not their energies been stimulated into action by privations. Man certainly could not, as the story of Eden proclaims; philosophy and experience unite in declaring that, had he been encircled with perpetual ease and abundance, the sloth and the glutton, with a mind torpid as in zoöphytes, had become united in him. His sin was indolence, and in a national point of view that includes all others; it is one for which there is no forgiveness—can be none. He preferred, and so have his unreclaimed and half-reclaimed descendants to this day, to live on spontaneous food rather than earn it by labor as commanded; hence it was a blessing to expel him—a curse to let him stay. Had he been permitted in loose idleness to live—

"With brother brutes the human brute had grazed."

No one doubts that at his advent ample provision was made for him—else he had perished in his nonage—and that it was continued till by increasing numbers the species was established. He was then urged to retire from a location merely intended as the cradle of his infancy—a nursery in which he was to grow till strong enough to provide for himself. His very nature and organization made labor necessary to both mental and bodily vigor, but in the midst of plenty he had no motives to activity nor useful pursuits. Without it the race must have become extinct. Even now, with all our experience of the value of science and art, were the earth to bring forth, without culture, food in superabundance, and continue to produce it, mankind would inevitably fall back into barbarism.

As with man, so with all terrestrial creatures. None came till the earth was ready to receive them. Every genus had its Eden, in which its first representatives burst into being, and were nourished till strong and numerous enough to migrate. They, too, were then driven out.

If, therefore, wants had never been felt, THE ARTS had never been known, and without them there could have been neither science, refinement, nor morals. Happily, then—thrice happily—did sterility of soils, inclemencies of seasons, scarcity of game and other food, force man to reflect, invent, and construct—to become an artificer—and thereby to clear the way for the unfolding of the higher qualities of his being.

THEIR EARLY DEVELOPMENT.

In the arts of modern animals we find those of their earliest representatives, and in the handicrafts of living barbarians we may contemplate those current in Eden and in the colonies that sprung up around it; for there is as marked a resemblance in the primal devices of man, as in those of the groups below him, and necessarily so, since originating in the same wants, the same instinctive impulses suggested and will ever suggest them. While pressing emergencies gave rise to primal devices, necessities led to their improvement and multiplication. Whenever a marked advance took place, it seems to have arisen in much the same way as among inferior beings. If we examine the

habits and actions of these, we shall find the same diversity of temper, talents, and their consequences, prevailing as with us. The ingenious and industrious thrive; the idle and inexpert suffer. Every creature, from the lion to the lion-ant, the eagle to the ephemeron, is the author of its own fortunes, good or bad. Some, in advance of their fellows, modify staple structures and stratagems to meet unusual emergencies, and are rewarded for their pains. They are the inventors of their tribes. Novel circumstances suggest new ideas, which become manifested in new forms, materials, and practices. Precisely so with the animal, Man: As circumstances changed around him, so did his devices; and hence useful results gradually accumulated, and the avenues to civilization opened.

If necessities were the parents of invention, conveniences were its nurses and enjoyments its teachers. As society improved so did these, and keeping in advance, they courted and encouraged it on. Suggesting new ideas, they kept enlarging human prospects and eliciting new desires, which required higher efforts to fulfil. In this way the most refined of people have risen from the rudest, and in this way people must always rise. Every decided acquisition in the beginning leads to another, and it to others and others; so that the truth is now becoming apparent, that accessions to science and art can only cease with human progress: and the converse—when it is arrested, they must decline, and as it retrogrades they will disappear, one by one, till the race revert to primitive ignorance and infelicity.

WHAT IS YET TO BE DONE BY THEM.

The faculties of those who talk of limits to knowledge, and to the fruits of knowledge, are nascent. They have neither full nor half-grown ideas of man's powers, and the miracles in agriculture, chemistry, and mechanics, he has to perform. Would they judge of the future by the past, or determine what is to be, by what is? Do they think the earth is to remain as now—the greater part arid moors, dark forests, and morass? A larger—much larger—proportion of their own species, too, as destitute of mental and moral cultivation! Why, man is only entering on his task—by a few preliminary and scattered experiments preparing himself to set about it.

An infinity of work is before him. As an agriculturist, he has to lay and keep enlarging the basis of the social column. All but an insignificant portion of his splendid patrimony is yet wild land — this he has to reclaim and convert into orchards and gardens, into grass and grain-growing fields. The richest sections, the tropics, so exuberant in fertility, are to be subjugated — hardly touched by the plough, though deemed the birthplace and special homestead of the species. Free and facile communications with and through all have to be established. Add to this the purification of the atmosphere from malaria — for, by human providence, salubrity is to succeed the baneful miasma of marshes — the hot-beds of fevers and agues are to be dried up, and human life and life's happiness prolonged.

The nature and properties of myriads of unknown plants have to be ascertained — the valuable fostered, improved and multiplied; the noxious and useless suppressed. So of animals — for to us is committed the power of moulding and multiplying such as are serviceable, and of annihilating others, by removing the conditions under or by which they alone can exist. By the exercise of this prerogative, results have been brought about as singular as any in *vegetable and artificial* organisms. Dimensions, forms, colors, propor-

tions, habits, tastes, and the very faculties of the lower tribes, have been changed — so much so as to make it doubtful whether species and sub-species may not be due after all to this strange plasticity of animated nature. The earth is a laboratory, in which as a chemist man has hardly begun to operate. A few loose samples of what it is composed have been partially analyzed, but the bulk is not yet broken into. Then the infinity of processes ceaselessly and silently going on in organized and inert matter has to be grappled with. As a factory, too, furnished with implements and materials in superabundance, little has been done in it — nothing worth naming, in view of what has to be done. The rich stock has been neglected — not half of it has been yet even seen — while forces for fabricating it have from the beginning of time been, some running to waste, others lying dormant for want of being called up to labor.

When every force, latent and manifest, is brought into service and made the most of — when man has spread his influence over every foot of the earth's surface, and brought the stores beneath it within his reach — when mundane matter, in whatever form appearing, is made to contribute to his ends — when the planet is wholly changed from its natural wildness, as a harbor for untamed brutes and noxious reptiles, into a fit theatre for cultivated intelligences — it will be time enough to speak of human advancement as culminating, and the arts as approaching the limits of perfection.

Till these things come to pass, instead of looking for no more discoveries, we should be prepared for a constant succession of them. Prepared or not, they are sure to come; for the hosts of keen intellects interrogating nature in our own country, and the legions as busy in others, are not entreating her for nothing, nor for trifles.

Civilization may be likened to a statue, the carving of which is the business of the species. It includes all duties and furnishes appropriate employments for the varied capacities of all men for all time. Each successive age withdraws one band of laborers, and brings forward another, whose faithfulness, awkwardness, or negligence, advances or retrogrades the work. Under barbarism it was a shapeless block; with the dawn of knowledge its features began to appear, and then nations occupied themselves in chiselling away superfluous material and bringing them into higher relief. During the last century some artist-like touches were added — more have been in the present one — and in the next this great moral sculpture will be further improved, for the time can never be when to it new graces and a higher polish cannot be given. To those who add nothing to it existence is a blank.

DISCOVERIES AND IMPROVEMENTS ENDLESS.

The arts are like plants, proliferous, and like them, too, can only be improved by culture. The transformations wrought by horticulturists and pomologists are all but incredible. Peaches were originally poisonous almonds, and used to impregnate arrows with deadly venom. Cherries are derived from a berry of which a single one only grew on a stem; nectarines and apricots are hybrids of the plum and peach; the chief of esculents, with its relatives, broccoli and cauliflower, come from a marine plant, from the common sea-cale, which shoots up on some sandy shores. From wild sour crabs, scarcely larger than boys' marbles, have proceeded all varieties of apples. The largest and richest of plums are descendants of the blackthorn's bitter sloe. Such are mere

specimens of vegetable metamorphoses brought about by transplanting, acclimating, crossings and culture.

It is much the same with the fruits and flowers of art. They are nothing till improved by cultivation; and from very humble and ignoble sources they, too, spring. A fowling-piece is a child's pop-gun elaborated; clay-huts were the germs of our marble mansions; a ship is a ripened canoe; and the steam-engine itself may be traced to covers ejected from primeval caldrons. The highest elegancies are descendants of very homely progenitors. Our ladies adjust their shawls of cashmere before glass mirrors supported by Psyches; primitive belles covered their shoulders with skins of newly-slain animals, and admired their unctuous faces in pans of water and polished stones. A Jacquard loom is an Indian's weaving frame matured; and printed volumes are deducible from quippos and historic belts of wampum. Like plants, inventions grow and multiply, and to congenial minds present a class of varied beauties, captivating as any with which amateur and professional florists are charmed.

Newly acquired truths in physics are keys, each of which unlocks a world of wonders. Every new art gives birth to a thousand. The range of discovery is undoubtedly illimitable—a truth that has only dawned recently with full conviction even upon savans. A century ago few minds were prepared to receive it, and fewer to act on it. Pregnant with hope, with present and prospective acquisitions, it is among the divinest of modern convictions. Navigators have added, some islands, others continents, and the woolcomber's son of Genoa gave a hemisphere to geography. This done, comparatively little was left of the earth's surface to explore. It is not so with science, nor the applications of science. In them fresh additions, new continents, new worlds, and new systems, are realizable for ever. The study of nature's mechanisms, of God's own applications of the same principles and materials He has given inventors to work with, is only beginning. The UNIVERSE is before inventors, and all its elements and energies invite their attention. There is, therefore, no danger in expecting or attempting too much, provided they aspire not beyond where Nature herself has gone, and even then illusions vanish with experiment.

There is a good moral to be drawn by daring inventors from this fathomless and boundless ocean of novelties,—it is this: Avoid crowds of small craft in quest of improvements, and launch out your barks in search of original things. True genius is rather ambitious to bring up pearls of its own, than solicitous to polish those of other men. Since there is such abundance of room for all, it should be the determination of every one to occupy some ground of his own,—to use another figure, to seek "*placers*" untouched, in preference to sifting in old diggings.

DIGNITY OF MECHANICAL PURSUITS.

It is a singular vagary that men to whose genius and industry the world is indebted for what is most valuable in it, should have always been held in low esteem. A habit of modern, it was a passion in former times, to look askant at those who use the hammer or spade, under the fond delusion that the less wise men have to do with gross matter, the nearer they resemble the Great Spirit; whereas God is the greatest of workers—the chief of artificers. So far from locking up his wisdom in abstractions, he is incessantly embodying it in tangible things; and in them it is that his intelligence, ingenuity, and re-

source are made manifest. What is this world but one of his workshops, and the universe but a collection of his inventions? In him the squeamishness of half-formed philosophers and of high-bred fashionables respecting manual and mechanical pursuits finds no sympathy, but terrible rebuke. His works proclaim his preference for the material and useful to the merely imaginative, and in truth it is in such that the truly beautiful or sublime is to be found. A steamer is a mightier epic than the Iliad; and Whittemore, Jacquard, and Blanchard, might laugh even Virgil, and Milton, and Tasso, to scorn.

There is, moreover, a morality belonging to the arts that as yet has been little heeded; a lever, hammer, pulley, wedge, and screw, are actual representations of great natural truths, and the men who revealed them may be said to have been inspired. The divine afflatus flows through many channels. In fact all truths are allied—the decalogue being an exponent of moral, as are mechanical inventions of physical, and axioms in science of philosophical verities—hence, whatever science discovers and art applies is divine, and ultimately tends to eradicate evil; indeed, all teachings begin with the arts, and nothing is more certain than that all must end with them. If we glance at existing nations, we invariably find those that excel in arts and sciences most deeply imbued with moral principles—the foremost and most active in the benevolent enterprises of the age.

Inventors, then, are revealers and expounders of the practical doctrines of civilization, and more than any other class have they shown us how to lessen life's evils and multiply its good. The connection of morals with expanding science and art, and the necessity of their union to the elevation of the species, are beginning to elicit attention. It is now perceived that deviations from principles of science—either in agriculture, arts, manufactures, in processes or pursuits of any kind—are errors, and all errors, in an extended sense, are SINS—are violations of Divine laws. And though sins of ignorance they carry, and will for ever carry, their punishment with them, viz: in imperfect results and the infliction of unnecessary inconveniences, expenses, and toil, in spending strength for naught.

Not till mechanical as well as ethical science is fully explored and universally applied can man attain his destiny, and evil be swept from the earth.

It has been regretted also, as an evil of magnitude, that, while the arts administer to the necessities of the species, a general knowledge of them has not been demanded as a feature of popular education; that while the works of historians, poets, and theorists, have been adopted as models by which to form the taste and excite the ambition of youth, the great doctrines of life, as exemplified in the processes by which the products of the planet, its forces, and the properties of its substances are converted into the elements and accessories of material and consequently of mental refinement, have been neglected.

But such are errors belonging rather to the past than the present or future. Their detection is a presage of their disappearance. Evils incident to the progress of society they, with many others, are only gradually to be surmounted. The philosophy or physics of the workshop is but beginning to be understood,—true estimates of its value to be formed:—indubitable proofs, however, that the movements of civilization are onward and upward. It is now perceived that in ordinary avocations, principles of science are invoked that furnish subjects of research to the profoundest minds, and such as may serve to quicken and enrich the perceptions of the most inquisitive.

INVENTORS AND WHAT THEY HAVE DONE.

A world without inventors would consist only of forest and swamp. Before they appeared, it was, and where they are not, it is, an Australian jungle, through which men affiliated with beasts roam in quest of miserable subsistence and shelter. The difference between the civilized and troglodytes is, one class contrives, the other does not. Nothing is clearer than that mechanical inventions are ordained to animate, clothe, and adorn, a naked and torpescent world—to infuse into the species the elements of increasing vigor and felicity. Even as arts multiply and flourish, the chief labor of working out the great problems of existence continues to devolve upon inventors. Without them the prospects and hopes of the present had neither been seen nor felt. It is they who, by discovering new physical truths, are establishing the grandest of moral ones—*Perpetual Progress*—illimitable advancement in social, civil, and intellectual enjoyments.

The fact has scarcely, if ever, been glanced at, that nearly every marked advance of civilization began with and is due to inventors. Without disturbing old records, it is enough to turn a leaf of modern history. The substitution of fire-arms for primitive weapons, has wrought an entire change on the face of society. Another and ever-memorable epoch was introduced by the revivers of printing and inventors of type founding; another by steam as a motor; to say nothing of the revolutions brought about more recently by spinning-jennies, power-looms, ocean steaming, gas-lights, photography, railroads, telegraphs, &c., which so honorably distinguish our times from all that preceded them.

But for the artificer's skill, the sublimest of the sciences had not been attempted, nor the sublimest triumphs of human reason and research achieved. By means of two inventions, the extremes of creation are brought within the range of human observation, and the grandest of conceivable miracles demonstrated. With the microscope, the human eye discovers animated worlds in drops of liquid and grains of fecula, and may yet detect ultimate atoms in the most attenuant of the gases. By the telescope, the same eye penetrates and wanders at leisure through a space far beyond what was once thought the limits of an arch-spirit's flight. Leaving the satellites of remote planets behind, it resolves the infinitely more remote nebulæ, and, sweeping round the awful horizon, takes in what would seem half the universe.

At a more favorable time than Fitch lived in, Fulton rose, and steamers began to creep up rivers, next dashed over lakes and inland seas, and now are rushing in fleets over every ocean. Whitney appeared, and forests were swept away to make room for cotton fields—thus turning the soil from harboring beasts of prey, to raising clothing for half mankind. Daguerre, and the sun turns portrait painter—exemplifying a classic myth. Stranger still, Morse and his compeers have bridled the most subtle, fitful, and terrific of agents, taught it to wait, silent and prompt as a page in a monarch's ante-chamber, and when charged with a message, to assume the character of a courier whose speed rivals thought and approaches volition. From the beginning, means more or less rude and refined have been employed for the conveyance of material things, but not until now has the transportation of thought—of thought divested of aught visible or ponderable—been attained. Indian runners hasten with information through floods and forests, over hill and dale; but to carry it, they convey themselves as packages containing it, or as tablets on which it is impressed. So also with the contents of our mails—minds commune

with distant minds through the gross medium of printed and written paper; whereas, by means of artificially evolved lightning, a postal system is established akin to the spiritual; for by it, thoughts are made to dart through space unclogged by symbols and envelopes, and consequently unretarded by carriers and postmen.

The wildest freaks of fancy have been strangely verified in the telegraph, as *outré* bottle-imps and more attractive fairies; giving color to the proposition that in nature's arcana are germs of every popular superstition, and that no prevalent delusion is without its corresponding truth. Be this as it may, the chiefs of modern Prosperos, by means of a few strips of metal, release from jars of acid spirits so agile and obedient, that, on the slightest tap of its master's finger, each one flies with messages over a hundred leagues of latitude, delivers them, returns, and is in waiting for others before the signals can be repeated, or the pulse beat twice! An ancient elf boasted of putting a girdle round the earth in forty minutes—these modern sprites can really do it within half a one. If art and science allied have done such things, what is it they cannot do?

If machinery don't *think*, it does that which nothing but severe and prolonged thinking can do, and it does it incomparably better. In the composition of astronomical and nautical tables, accuracy is everything. Many a ship has been wrecked through wrong figures in "Guides" to navigation; but absolute accuracy, continued through abstruse calculations that occupy months, and sometimes years, is too much to expect even from the most sagacious, studious, and careful. But suppose it attained; the next difficulty is to transfer the results, untainted with error, to printed pages; a source of mistakes which few besides authors and printers can appreciate. If other persons were told of the impossibility of copying from manuscript millions of figures without misplacing, leaving out, or inverting more or less, they would hardly yield their assent. It is enough to say that perfection in elaborate and difficult calculations is unattainable with certainty by human figuring; nor is it to be expected in the professional labors of the most expert compositors.

Now, automata have been made to work out arithmetical problems with positive certainty and admirable expedition; relieving mathematicians and others of an incalculable amount of mental drudgery—drudgery that has worn out the strongest constitutions. Moreover, they carry the use of numbers further than the clearest intellects dare follow—to an extent that language lacks terms to express. In human computations, minute errors creep in and corrupt the whole, often requiring months of the closest ratiocination to find out; but calculating machines detect their own mistakes at once, correct them, and then shutting out the interference of human fingers as well as heads, and with them the chance of marring the work, they print their tables as well as compose them—thus producing works to which entire confidence can safely be given.

The power inventors wield is not less manifest in the changes they have wrought in the habits, customs, and occupations of females, than it is obvious in the pursuits of the other sex, in the outdoor world. They have not only broken up the time-honored arrangements of the kitchen, wash-house, and dairy, but have invaded the parlor and even boudoir. A century ago the rock and spindle were common;—in Europe are women who still twist thread with their fingers. Fifty years since, the wheel had a place in every dwelling, and carding no less than spinning was a domestic duty. With thrifty housewives the shuttle, too, was not a stranger. Within twenty years knitting was

indispensable; not a few of our farmers still wear homemade hose. Then straw-plaiting, tambour-working, lace-making, plain and fancy embroidery, with other delicate operations of the needle, were and are still taught as necessary accomplishments. Such they will hardly be held much longer, since these and various other performances are now done by automatic fingers with a precision, regularity, despatch, delicacy of touch and finish, that no human organs can rival.

Most, if not all, the fine arts have been subdued by mechanism. The lathe is still to be met with in its primitive forms, in the potter's wheel, the spring-pole instrument and also as used in the modern Egyptian's atelier—(seated on the ground, this artist employs one hand to revolve the object to be formed, holds the cutting tool in the other, and presses it on the rest with his toes.) The lathe, so long confined to shape articles whose sections were circles, now produces oval, elliptical, epicycloidal and eccentric work; copies medallions, and even busts in equal, enlarged or reduced proportions—performing the work of the engraver, die-sinker, and statuary or sculptor.

The richest figured tapestry and damask in relief, are now produced by magic mechanism. Looms rival the palette and burin; besides gorgeously-colored carpets, they weave landscapes equal to oil paintings, and portraits after the finest line engravings. Then, from the increase in number of sewing machines,* the time would seem not distant, when the needle itself, and thimble will be exhibited in museums with distaffs, spinning-wheels, knitting-wires, tambour-frames, hand-looms, lace-making bobbins and pillows, and other antiquarian curiosities, as evidences of imperfect civilization. In chromo-lithography, automaton artists rival the finest touches of old masters, and shortly will multiply by millions, their most esteemed productions.

Though not suspected, the power of inventors over human affairs, is already supreme; machinery even now governs the world, though the world does not acknowledge it.

ERRORS ENTERTAINED RESPECTING INVENTORS.

It is a prevalent opinion that both ordinary and extraordinary inventions cost their authors little labor and thought to develop: nothing is more erroneous. It is an essential element of man's being, and of the constitution of things under which he exists, that all truths, mechanical or philosophical, can only be realized by strenuous and continued effort. Our perceptive faculties are too obtuse, and happily for us it is so, to apprehend them at a glance. In that case, they would be held too cheap to be looked for, and deemed worthless when seen. If inventions required no exertion to discover, where would be their value? If virtue cost nothing, it would cease to be virtue. No fact is clearer than that man's destinies are in his own hands, and that he alone can exalt and debase them. To rouse him to be faithful to himself, is nature's ceaseless care. With powers dormant in him, and equal to every exigence, she leaves him to exert them or not. She does naught for him that he can do for himself, and has taken care that he shall know nothing, have nothing, that he does not strive for.

It is common to hear ingenious men disparaged by ascribing their best things to lucky or random suggestions—whereas, though appearing fortuitous, they may always be traced to previous reasonings or reflections: sprouting seeds whose transient plantings had been little noticed and forgotten. They

* Four patents have been issued from this office for such machines during the past year.

had never sprung up had they not fallen on soils prepared by previous culture to receive them. Sparks set not sand on fire, nor do fruitful ideas germinate in barren minds. Flashes of thought, like those of the electric fluid, may dart suddenly and unexpectedly, but they are not less the regular effects of inducing causes. Inspiration descends not in its highest or its lowest forms, but on those who seek to be inspired.

It is not given to man to perfect aught without toil, and seldom without long-continued toil. The smith forges not a ploughshare with a blow, nor is any new device, however simple, matured save by repercussions of thought. *Nul bien sans peine* is a universal truth.

PROSPECTS BEFORE INVENTORS ARE BRIGHTENING.

More corect views of genuine celebrity are obtaining, and high time it is, since the trumpet of fame has seldom been blown by a seraph. History, the voice of the past and which ought to have been a safe monitor for the present, has led the world astray with regard to honor and its truest sources. How little has it contributed to foster those occupations which tend to humanize the species, and how much to cherish others? It has done next to nothing for humanity but to debase it; fostering the worst passions, it has all but strangled the best. If not written for the sole purpose of preventing the earth from being enclosed within the pale of civilization—of continuing it as a series of hunting-grounds under old forest laws, for broods of human tigers—it seems to have been composed for little else. What is it on the whole but a recital of the feats of prize-fighters, and of the passions of brutalized spectators? Representing the arts of peace as mean, it has taught that nobility and glory are won amid rapine, conflagration, and slaughter. Its feasts, so called, are fitted chiefly to whet the appetites of accipitrines.

But it is one of the most encouraging signs, as well as a growing characteristic of the times, that paths to pre-eminence are opening to all men; that as honorable renown awaits agriculturists and artificers, as has been attained in other pursuits. There is, indeed, no degree of distinction which may not become theirs if they devote themselves to the latent truths connected with their professions; for as sublime principles of science are yet to be drawn out of the ground we tread on, and from the air we breathe, as have been discovered in the ocean of worlds above us. Justice will be awarded to enlightened workers as well as to mere thinkers—to laborers as to speculators on labor. Even now writers are beginning to expatiate on the poetry and morals of mechanism, on its powers to please and instruct; and by-and-by it will be admitted that, for rich and varied thought, for boldness, grandeur, and minuteness of conception—simplicity and complexity of design; for the union of the agreeable and the beautiful, the beneficial and the marvellous—poems carved out of wood and forged out of metals equal, if they do not surpass, the most imaginative of creations.

In permanency and purity of fame, few will hereafter rival practical men. Than they, few will stand higher among the great—none better among the good. Will his country ever forget the souvenir Fulton gave her? In what age will not children lisp the name of Morse? How often are popular writers accused of pandering to the passions; but what contributor to the arts is a corruptor of morals? Like the works of the Divine Artificer, theirs tend to elevate, not to debase.

If agriculture preceded the mechanic arts, its progress beyond primeval

efforts has depended upon them. They made it what it is, and are fast disclosing what it is to be—clearing the way for it to advance where it was never known, and to flourish beyond all precedent. Locomotives now darting, and others preparing to follow, through deserts and over wild lands, scatter rich blessings in their train; dark forests are falling before them, and cultivated fields and smiling villages are everywhere springing up on either hand—the mightiest agents yet revealed in enabling man to fulfil his destiny in subduing the earth.

If any classes can be said to hold the future destinies of the planet in their hands more than others, it must be engineers and mechanicians. These men are filling the world with new ideas and agitating it with their projects. Within the last half century they have revolutionized society, and are preparing to bring about still greater changes. We cannot move without feeling their influence, nor can the world go on a day without them. Although hitherto united by no bond of union, they will, if faithful to their mission, make themselves felt in its future management.

INFLUENCE OF FREEDOM ON THE PROGRESS OF ARTS.

The passion for philosophical inquiry and stirring enterprise, so characteristic of our citizens, is the natural result of independence in thought and action. Political oppression, however mollified, acts as a drag on the intellect. Shackled in one thing, the soul is more or less fettered in all. The genius of invention may exist elsewhere, but it flourishes only under the ægis of freedom. It could not do otherwise without violating an organic law of our being. Who thinks of looking for great thoughts, or for men to work out great problems of humanity, where mind has for ages been squeezed into moulds formed to distort and to dwarf it, and not rather where it is free to obey its native impulses and soar where it listeth? If practical science with us does not surpass what has been accomplished in it by others—if we do not contribute more largely to the stock and to the efficiency of automatic mechanism—either nature will not be true to herself, or we shall be traitors to her.

We experience none of the embarrassments and sufferings which the ingenious of other lands have for ages been struggling with. It requires no small amount of faith to credit them or the sanity of those who sanctioned them, and it is all but incredible that the oppressed, possessing the spirit and feelings of men, were not maddened into unquenchable fury by their deep and lasting wrongs.

Court profligates, in want of money, were invested by monarchs—who claimed a right to dispose of the property as well as persons of their subjects—with monopolies of the various occupations of the productive classes, and forthwith those who followed them had to purchase licenses to continue their trades, of the favored courtiers or companies to whom they sold out. This was carried to such an extent that no branch of business escaped; professions the most essential to existence, as those of the baker, miller, dealers in fuel, light, soap, &c., were thus disposed of. The genius of wrong presided over every department of industry and art—every addition to material civilization has been laid under contribution by it.

M. Perpigna, a French writer on the law of patents, alluding to the treatment of the mechanics and manufacturers of that country, has, in reality, portrayed the devices by which those of the whole of Europe were harassed, and by which some are still harassed.

Fettered and oppressed in every way as France was under the government of her despotic kings, the spirit of invention and enterprise could never rise to high conceptions. Manufacturers, placed under the severe control of men who purchased their offices from government, and who, therefore, exercised them with rapacity, could not hazard any improvement without infringing the established regulations, and running the risk of having their goods destroyed, burnt or confiscated. In every trade official regulations prescribed to workmen the methods of working, and forbade any deviation from them under pain of the most severe punishments. Ridiculous to say, the framer of these statutes fancied he understood better how to sort and prepare wool, silk, or cotton, to spin threads, to twist and throw them, than workmen brought up to the trade, and whose livelihood depended on their talent.

To insure a compliance with such absurd regulations, inquisitorial measures were resorted to—the residences of manufacturers entered by force—their establishments searched and explored, and their mode of working inquired into. Thus their most secret methods were often discovered and pirated by fraudulent competitors.

The excesses committed under these tyrannical statutes were such that one can scarcely conceive how any nation could long submit to them.

The minister, Roland de la Platiere, giving a deplorable account of the numerous acts of oppression he had witnessed, says:

"I have seen eighty, ninety, a hundred pieces of cotton or woollen stuffs cut up and completely destroyed; I have witnessed similar scenes every week for a great number of years; I have seen manufactured goods confiscated—heavy fines laid on manufacturers—some pieces of fabrics were burnt in public places and at the hours of market—others were fixed to the pillory with the name of the manufacturer inscribed upon them, and he himself was threatened with the pillory in case of a second offence. All this was done under my eyes at Rouen, in conformity with existing regulations or ministerial orders. What crime deserved so cruel a punishment? Some defects in the materials employed, or in the texture of the fabric, or even in some of the threads of the warp!

"I have frequently seen," continues Roland, "manufacturers visited by a band of satellites, who put all in confusion in their establishments, spread terror in their families, cut the stuffs from the frames, tore off the warp from the looms, and carried them away as proofs of infringements. The manufacturers were summoned, tried and condemned—their goods confiscated, copies of their judgment of condemnation posted up in every public place—fortune, reputation and credit, all was lost and destroyed—and for what? Because they had made with worsted a kind of cloth called *shag*, such as the English used to manufacture and even sell in France, while the French regulations stated that that kind of cloth should be made with mohair. I have seen other manufacturers treated in the same way because they had made camlets of a particular width used in England and Germany, for which there was a great demand from Spain, Portugal, and other countries, and from several parts of France, while the French regulations prescribed other widths for camlets.

There was no free town where mechanical inventors could find a refuge against the tyranny of the monopolists. No trade but what was clearly and explicitly described by the statutes could be exercised; none but what was *included* in the privileges of some corporation.

How was it possible for any invention to thrive under such oppressive regulations?

No one could improve on a method or deviate from the prescribed rules for manufacturing stuffs of cotton, worsted or silk, without running the risk of being heavily fined, having his frames destroyed, and his manufactured goods burned in the public place by the hands of the executioner.

Many inventors were forbidden to reduce their inventions into practice, when their application for letters patent was not supported by powerful recommendations, or when they were unable to bid a high price for the good will of the clerks of office.

What made the rights and privileges of corporations still more odious and oppressive, was that they were granted for an unlimited time.

But the public mind, instructed by the writings of Voltaire, Rousseau, Montesquieu, and many other authors, had become too enlightened to allow such abuses, transmitted from ruder times, to be maintained in their original barbarity. A cry for the emancipation of the human mind, raised at first by philosophers, was soon echoed by the people, and a concession to public opinion became every day more necessary.

A declaration of Louis XV., made in 1762, reduced all privileges to fifteen years. This was certainly an amelioration.

The memorable edict of 1776, given by Louis XVI., by suppressing all monopolies and corporations, opened to arts and manufactures a new career, and offered a powerful encouragement to industry. But this suppression of monopolies excited the opposition of private interests; and the French ministry, by annulling, without any compensation, monopolies which had been purchased by several trades, and sold at different times by Government itself, committed an injustice and breach of faith which the best intentions could not justify. The celebrated Turgot, framer of the edict, was obliged to retire from office, and the edict itself was repealed.

After the failure of the attempt made to throw open every trade and every profession, several other edicts were issued to lessen the oppression of the existing statutes; but the evil had taken too deep a root to be removed by such weak measures. It subsisted, therefore, more or less until the French revolution, when all privileges were, in one day, abolished and destroyed.

French arts and manufactures, freed from bondage and from the oppressive yoke under which they had groaned for so many centuries, began a new life. The French people possessed at last the free and uncontrolled exercise of their faculties, by the removal of obstacles which a blind policy had thrown in the way of improvement. That was a material point obtained, but it was not sufficient; it was necessary besides to secure to all men residing in France, whether natives or foreigners, the peaceable enjoyment of the fruits of their exertions; this was done by the laws on patents, passed in the year 1791."

The connection of civil and religious emancipation with progress in arts, and consequently with the highest of human interests, is becoming daily more and more apparent. The influence of free institutions is extending far beyond mere political regeneration; they have higher objects to attain and grander results to bring about. It is not enough for them to lift up the long prostrated victim of oppression—to cause him to stand erect, and with palpitating heart and swelling chest, to feel himself a man; this is but preliminary—a removing of the loads that have pressed down his aspirations and held him from his destiny. They have to introduce him into higher dispensations, intellectually and morally. By the silent teachings of our example the world is

awakening to the evils of absolutism as a foe that would rule the present by the past, and perpetuate a combination of puerilities and wrongs that are doomed to be associated with fossil remains.

A belief is prevalent that the enfranchisement of the world is drawing nigh, nor are they who believe this without grounds on which to rest their faith and build high their hopes. Everywhere men are beginning to feel that they are not made solely for rulers to sport with and prey upon; to be drilled as gladiators for their pleasures and used as drudges for their profit; to have the most sacred of natural rights taxed as privileges—to endure an excise on existence. Better for millions had their organization been below the human type, than have their soul's impulses crushed and the chief purposes of life foregone in order to minister to the luxury and perpetuate power in the hands of the infandous.

The great reality of the age, the start taken by the species in social, civil, and intellectual advancement, is not more observable in the improved and improving condition of the arts than is the fact that it *originated in them.* The movement, too, not only began with, but its increasing momentum comes from them. If they flag, so must it; while they progress, nothing can retard it. But the prospect is joyous, for as respects them the cup of the future is brimming, and foaming, and sparkling, with hope. Never before have draughts so refreshing, so pure and priceless, been brought within reach of human lips. To arrest them, enemies of progress should levy taxes on electricity and steam, as they have upon knowledge; or ask the Deity for their sakes to withdraw water and fire from the earth and lightning from the heavens.

To proclaim perfect, that is, absolute liberty to the sciences and arts, is to establish the sanctity of human rights on their surest, because their natural foundations. Had rulers never been permitted to meddle with them—to cripple under the pretence of protecting them—to smother genius while affecting to foster it—our current marvels had been developed ages ago, and devices and discoveries yet in the womb of the future had been in universal use now.

Leave the arts free, and the world can never become a desert again. There can be no decay of nations without a decline in them; but when they are no longer fostered, or when such only are cherished as tend to aggrandize the great, empires *must* become extinct and their proudest monuments crumble away. Ancient legislators did not understand this, and the present disordered condition of a great part of the earth is the result of their ignorance. They preferred the exaltation of a class to that of the masses, mistook magnificence for power, and military force and idle display for prosperity. What are the accounts of their contests, and what the relics of their palaces and pyramids but monuments of their folly—sad reminiscences of populous cities, now desolate wastes—of people once mighty, now no longer known. Had they perceived that nothing can be lasting that is not beneficial to society at large, and had they under that conviction devoted the treasures they squandered to the general diffusion of science and art, the earth had not now been sprinkled with the tombstones of nations.

V.

THE MOTORS:

CHIEF LEVERS OF CIVILIZATION.

THERE is one subject more intimately allied than any other with progression, and of unrivalled interest in the present and prospective condition of the world, viz., that of *the Motors*. It is deemed not improper to dilate briefly on these chief levers of civilization, with the view of bringing them more immediately to the notice of inventors, and of invoking the attention of Congress to a series of proposed prizes for new prime-movers and other discoveries in science and art. A hint to the ingenious is as a word to the wise—to name desiderata has often led to their realization.

Physical forces are everything on our orb, as they must be on every other. It is motion that imparts vigor and beauty, animation and colors, to nature; and motions are merely manifestations of forces. Deprived of these, the earth, instead of her diversified harmonies, would present a lifeless and chaotic mass. There could be no transition or change; a breath could not blow, nor a tree grow, nor animals or atoms move. They are the conservative agencies of creation, and the bases of even intellectual and moral developments.

Of their nature little is known, save that, like most natural phenomena, they are infinitely diversified in their manifestations. Not amenable to any faculty of the senses, they are known to us only by their results. Apparently strangers to, yet they dwell in and are energetically at work in the most silent and quiescent of bodies—ceaselessly decomposing and recomposing them—as well as the restless and the living. They whirl planets round their orbits, and children's tops on our floors—are disclosed in the movement of an eyelid, the buzzing of an insect's wing, the struggles of an elephant or a whale—in the sprouting of a plant, and the upheaval of a continent, in the imperceptible ascent of vapor, as in descending torrents, in combinations of acidulous and alkaline solutions, in the poles of a magnet, explosive mixtures, volcanoes, thunder, lightning, snow, hail, and wherever a change of temperature takes place.

The primal elements of civilization, it was necessary that chemical and mechanical forces should be found in abundance, so as to keep up, *pari passu*, with man's progress. And such is the fact; the earth is a storehouse of them, in which they are furnished as it were, in packages of all sizes, qualities and intensities, so as to meet all possible exigencies. And it will appear that as he calls them into his service, they become the proofs and the measure of his advancement; for in proportion as he employs them, intellectual and moral attributes accumulate upon him.

Inventions for modifying and conveying motion from one machine to another, or for distributing it to various parts of the same machine, frequently

evince striking ingenuity; but the disclosure of useful forces indicates a higher order of research, and is fraught with vastly more important results. Improvements in mechanism are to a certain extent limited and local, but the advent of a new motive agent would be felt throughout the circle of the sciences—as exemplified in the case of steam. It would open new channels of industry and wealth, and give rise to devices and applications novel and innumerable.

Man rises with the motors. His growth begins with them, and only as he extends their applications or adds to their number, can he increase in real stature. Nothing can compensate for their absence, for nothing valuable can he acquire but through them. Steps of a ladder resting upon earth and reaching to heaven, he is without them an earth-worm, with them almost a God. His destinies are and ever must be wound up in them.

The chronology of human condition is comprehended in the cycles of the motors, and in them will that condition be best studied and understood. We are not to suppose that the annals of nations are for ever to be meted out in petty dynasties, or those of the species by mere circles of years; on the contrary, the probability increases that eras will be determined by revolutions in science, and the condition of generations measured by their chief motive-agents.

NONAGE OF THE MOTORS.

Take up man's biography where we will, the first page opens with him roaming the forest—an untutored animal, preying upon inferior tribes as they prey on one another. He knows no force but his own, dreams not of employing any, and hence is his own servant in everything. By-and-by, as game becomes shy and scarce, he ekes out the means of living by cultivating a patch of mandioca or maize—using a stake for a plough, and a shell for a sickle. In this condition properties of some of the elementary machines unfold themselves, as those of the wedge, inclined plane and lever. In his club he realizes those of the hammer, which has claims to a place among them. Still he remains a wild man—a savage. Such is the nonage of the motors, and such man's invariable condition where they are not.

While there is a wide disparity between man's muscular power and the requirements of civilization, there is an observable proportion between it and his wants as an unreclaimed animal. The required outlay to procure the first necessaries, is neither too much nor too little. In the savage and semi-savage condition he has strength to build a hut, hunt, dig, plant, and reap, a sufficiency for himself and family; but had these essential tasks required double the labor that they do, the race would have sunk under it ere the art of calling in foreign aid had been acquired. On the other hand, if food, clothing, and fuel had been attainable with half the exertion, indolence and every evil passion would have prevailed; hence the wisdom of Providence in forbidding the earth to yield the means of existence except in return for such an expenditure of labor as would train him in the first stages of his career to habits of industry, and prepare him for disciplining higher faculties by another species of activity.

It is true the amount of indispensable toil differs in different parts of the earth. In the torrid zone the soil is prolific, fruits are perennial and in rich abundance, little is required for shelter and less for clothing; an equalizing principle is, however, everywhere apparent. There men are less able to

work—their energies are sooner exhausted than in temperate climes, but exertion is inevitable. They also are forced to labor in order to live.

ERA OF ANIMAL FORCES.

In the next stage he plants more and hunts less. The social qualities of his being open, and higher views of existence flit before him. His hut in the woods is abandoned for the village-cabin. Primitive manufactures arise, improve, and multiply. Agriculture is more and more appreciated, and with increasing demands for it, the value of labor is felt; he wants more than he has; human strength is not great and is soon exhausted; in his need he reflects, and reflection brings help. There are quadrupeds stronger than he, and of greater endurance; why should they idle away their existence and he be compelled to daily toil? Why not make some of them work for him?

Thus he reasons, and, according to climate and other exigences, acts. Hence Laplanders yoke reindeer, and Esquimaux dogs to their sledges. The Arab early seized the dromedary and camel as his drudges, and other people the ox. The slender Hindoo and lithe Malay bring in the elephant from his native jungles, for the same purpose. Finally, the horse, mule, and ass were added to the list, and the era of animal forces exhibited in relief.

Other creatures were also educated for man's profit or pleasure in a less general way. Goats and dogs were trained to climb in tread-wheels, and bears were broken in to the same kind of labor by Scandinavian tribes. Then there was hawking, leopard-hunting, and fishing with cormorants, as still practised by the Chinese. Old Egyptians taught baboons to gather fruit from precipices and trees inaccessible to man. The Chinese still employ them and monkeys at similar work.

From the excess of power with which some animals are endowed, it may be inferred that they were designed to serve as co-laborers with man. Were this not so, it would be difficult to assign the reason why the larger quadrupeds that have been domesticated possess a surplus of strength far beyond what their natural emergences seem to require, while to us who stand in the greatest need of it, so small a share has been given. As all acting forces on the globe are derived from bodies living or inert, it was nature's suggestion, first to turn to the larger quadrupeds; the most decided step this toward civilization. In what a lamentable state would our species be now, had it yet to be taken! From their comparative docility herbivorous tribes were properly selected.

The power man exercises over animals, is one of the most remarkable episodes in his history. It is miraculous, but, like other miracles, having become familiar, it ceases to surprise. They are plastic almost as clay in his hands, for he moulds them as his fancy and wishes suggest. Selecting some as laborers, he adds muscle and bone, or withdraws them as strength or speed is required. Thus he produces race and draught horses from one stock, and works equal changes in porcine, bovine, ovine, and canine families. Of fowls, take pigeons for an example; their figures are so far under his control that he multiplies varieties till every apparent affinity with the original is lost; their colors, too—producing spots where he pleases, or, as the professional expression is, breeding them "to a feather."

Larger numbers of animals are employed as chemical manipulators for the production of such substances as he finds useful for his purposes, and which he compels them to yield in larger quantities than they would or could give

out without him. He controls the qualities of these products also; eliciting in excess constituent elements that he most desires. Of insects he keeps myriads at work as confectioners—other tribes as spinners, and others again as druggists to supply him with dyes. We may boast of interesting compounds which modern chemistry has furnished, but what are they compared to the products of these living laboratories—laboratories, the most valuable of which he has improved and multiplied, and will, until analogous results, at a cheaper rate, are obtained from artificial apparatus.

Had nothing been told us of ancient American arts, we might have inferred the amount of refinement pervading Chili and Peru from one fact alone—the employment of the llama as a beast of burden, the only one within reach—a step this which tribes wholly untutored never took. The aborigines of the north had the bison, and in the proportion that its strength exceeds that of the American camel, would they have excelled their Austral kindred, had they broken it to the yoke. They neglected to improve the talent committed to their charge, and are compelled to make way for those who will. The buffalo, for unknown ages, has been used in tilling the soils of Asia and Africa. Had our Indians pressed it into the same service here, they would not now be as fugitives and vagabonds in the land of their fathers.

The vast multitudes of bisons slain yearly, the ceaseless war carried on against them, if continued, threatens their extermination, and must hereafter cause deep regret. It has been remarked that every addition a country receives from art tends to drive away animals fitted only to flourish in a state of nature; but here, in the absence of art, the very agents to introduce it—creatures adapted above all others to human servitude—are wantonly destroyed. Their great strength and docility, when tamed, and their capacity for being drilled to the yoke, ought surely to put some limit to their wholesale butchery. Savages kill them for food, while men of another shade, who ought to know better, join in the slaughter for the pleasure of the hunt, and sometimes, it would seem, for material for a paragraph.

What one offender has said is applicable to thousands. Describing the grand and terrible bearing of an old bull tearing up the ground; how one ball was flattened by, without penetrating the skull; how a second barrel drove another bullet into the victim's vitals and brought on its dying agonies: he adds—"I was satisfied, and taking the tongue, the hunter's perquisite, retired." Rejoining his party, who had abundance of food, he left the carcass, as is usual, for vultures and bears.

But for this genus it is doubtful if man had ever permanently emerged from the forest. As the first ordained and most profitable of his assistants for working the soil, it should never be said that the noblest of American indigenous ruminants have become extinct. As predial laborers, they belong to the most precious of quadrupedal existences, and, viewed in that character alone, their wanton destruction should be arrested. Reproductive locomotive engines, they offer a power available to turn the wildernesses and prairies they inhabit into corn-fields and gardens.

"Onward!" is the standing order of God. Those who refuse to obey must be pushed aside—such is the inflexible fiat of Heaven. They who prostrate their judgment to their sympathies are at a loss to reconcile the melting away of the red race, and the seizure of their lands by the whites, *with* a superintending Providence. How so terrible a catastrophe as the *disinheriting* and consequent annihilation of the entire occupants of half

the globe can accord with Divine justice, or how the righteous and Supreme Arbiter permits it, they cannot see—simply because they have yet to learn that the Creator has ordained distinct and independent laws for the material as for the moral world—and that obedience to one class cannot, under any contingencies, compensate for neglect of the other, nor evade nor diminish the consequences of their violation. The action of those relating to external nature can neither be arrested nor accelerated by principles of ethics; the wicked who obey them will prosper, the righteous that neglect them must perish. No man's virtue makes his body bullet-proof, nor can the better qualities of an ignorant, idle, roving race, induce God to throw the world off its hinges to indulge them for ever in such habits. Races and nations are saved by works, not by faith.

INORGANIC MOTORS.

Human and animal powers are limited, require replenishing by food and rest, are uncertain from sickness and casualties, unequal and quickly worn out. Had none but such been within our reach, civilization had been arrested ages ago. It was necessary, in order to fulfil his destiny, that other than living forces should be under man's control—and in the acts of discovering and applying them, his character and energies were progressively to ripen. The first of the kind were forces naturally excited and ready for his service.

WATER.—Observing minds from the beginning noticed the momentum of water in cataracts, rapids, and quick running streams—nor could those of an inventive turn fail to perceive its application to laborious operations in the arts. A stream that hurried along trees and other heavy bodies would easily sweep round a few boards arranged around an axle and made to dip in it—an under-shot wheel. The first motive water-wheel mentioned in history, was suspended between two boats moored in a current—though asses and mules had previously, to some extent, relieved Roman women from the eternal toil of the quern. Breast and over-shot wheels quickly met the diversified conditions of motive-fluids.

A canal enthusiast once declared his conviction that rivers were made to supply artificial conduits. Had he said the surface of the earth was broken into mountains and valleys with the view of affording its occupants motive powers in running and falling waters, he had been full as near the truth.

In the case of water we have an early example how, as knowledge increases, man rises from the driving to the superintendence of machines. In the first stages of his career he is of necessity a painful toiler; but as new forces are found out, he exchanges the drudgery of a slave for the dignity of a director. Instead of consuming his sinews and marrow in gross unmechanical strivings, his intellect is brought into action, and teaches him by merely opening a water-gate, or stops of other motive reservoirs, to call into service energies surpassing the combined efforts of thousands of men—to make a gas or a liquid do the work of human machines. He then begins to comprehend that nature has not intended him to labor as a brute any longer than till he learns to manage other energies which she has placed at his disposal. Many ancient people excelled in mechanical arts, but were blind to the application of inanimate motors. Cities and hamlets were located on the banks of rapid streams, from which the weaker sex had daily to bear water for domestic uses—the liquid *power* meanwhile running unheeded by.

WIND.—At what period wind was first siezed as a servant, no reliable accounts are extant—certainly not as an established one, until animals had long been enslaved. Sailing vessels have been impelled by it since the birth of navigation, but as a driver of stationary mechanism it is supposed to have been little used by the ancients. Be this as it may, they who first drove machinery by aqueous and aerial currents conferred incalculable good on their kind. The species made a greater leap than ever before. To compel unconscious matter to do man's bidding—making gales and gushing torrents pause to labor for him; with an energy, too, surpassing that of living laborers—was a new idea, and one of a higher type than previous millwrights had sought for. That idea and its realization opened the epoch of inorganic motors.

It was natural that the two grand fluids of our earth, the most abundant and palpable, should head the list of the inorganics. Everywhere their efforts were seen and felt, and from the beginning they had courted man's attention. In gentle ripples one would dance before him, and with increasing force run past him; here it swelled and boiled and foamed—and there, with resistless might, swept all before it. In like manner the other constantly reminded him of what it could do for him if he would; whispering in zephyrs as if to persuade him—murmuring in the breeze, then screeching in the gale at his indifference—and now and then resenting his neglect to profit by it, by unroofing his dwelling, or prostrating his forests and fences. A dull pupil, nature has had to flog knowledge into him—to awaken his energies by his necessities—by his fears as well as by his hopes.

Not till water and wind mills were called in to assist him, could man be said to have fairly left semi-barbarism behind him—nay, scarcely that, for the Chinese, the oldest of existing people—the most mechanical, and who have brought down not a few antediluvian arts—have them, and they are not much beyond it.

FORCES ARTIFICIALLY EXCITED

STEAM.—Nature provides in everything for man till he is able to depend upon himself. Her aid is designed gradually to unfold his resources and lead him to rely upon them. Preceding motors he found ready to his hands, but the exigences of advancing society made demands which they could not meet. Progress was to be arrested, or he must discover and render available a new one. In what direction should he turn but to the forces which lay sleeping in inert matter? Of the existence of some he was well aware; of their adaptation to his purposes he had received many intimations, while experience, in rendering available the grosser fluids, prepared him successfully to excite and control some of them. His efforts were rewarded beyond the wildest of his hopes. Steam, the most potent and pliable of motors, has worked, and is working miracles in his behalf.

Whatever may be thought of other ameliorating influences, inorganic forces artificially awakened, will ever be the foremost of the civilizers—the steeds to draw society's car onward; and of them relays are assuredly provided, so that whenever one becomes fully used up, the most made of it, another will be ready for the harness. We see what the first of this class has done—advanced us farther in an age than was ever before accomplished in a hundred. We have run where our forefathers crept. But unparalleled as are the effects of steam, its moral influence is still more precious. In rousing *mankind* from the listlessness of olden times, it has opened sources of endless

acquisitions; has given us a standard more elevated than was before thought of, by which to measure ideas and expectations of the future; raised the screen from before a prospect exceeding in brilliance aught that had been reflected on the mental retina; and established the great truth on which human progress depends—"*when man wills, matter must obey.*"

Thus it is that though few, as yet, and making their appearance after long intervals, the motors are the real sources and true registers of civilization. Marking a regular progression, each elevates man higher in the scale than its predecessor. In their nonage his knowledge is little more than instinct; in the subjection of animals to labor, his intellect awakens, becomes inquisitive as inorganic forces are realized, and since aqueous vapor has become a popular motor, the mental torpidity of previous epochs is in a great degree cast off and inquiry put on the alert in every department of research. That the next which comes in will be attended with results equally marked, there is no room to question.

Every motor is known to add to the value of those that preceded it, either by leading to new properties in them, or by furnishing additional means of economizing and transmitting them, and thereby enlarging the area of their operations.

With steam a change full of promise has come over the world, such as philosophers and statesmen of former times could neither anticipate nor appreciate. Henceforth, nations, aware of their true policy, will strive with each other in conquests over Nature. Her unexplored realms will be invaded, and priority of discovery rewarded with laurels unstained by a tear, and such as angels might covet.

ATMOSPHERIC PRESSURE.

It is obvious that no motor less valuable than steam can be allowed to displace it; still, several may excel it in other qualities, though less efficient on the whole, and these will assuredly be admitted as aids, if not as principals. In looking around for such as are not confined to places—as water, nor to times and seasons—as winds, there is one which costs nothing to carry about with us, and requires not the removal of machinery or materials to meet it. Where man is, it is; go whither he will, he cannot leave it behind him. More faithful than his dog, it is ever at his side; an eternal source of mechanical power, omnipresent, illimitable, constant, free to all people, common to sea and land, easily excited, and of endless application.

And what is this but the bland and silent firmament, which, pressing with the weight of a ton on every foot of surface exposed to it, offers a power adapted apparently to every exigence—one whose intensity can be modified indefinitely—pushing, if we wish it, imperceptibly as the falling dew, and at our nod descending, resistless as an avalanche? The breath of living mechanisms, why should it not become the animating spirit of artificial ones? What is there to hinder atmospheric pressure from being adopted as a common, if not a general motor? Little is wanted to make it one—a cheap and quick process of exciting it being alone required.

The sea is the receptacle of the world's waters, the firmament of its gases. All substances are worn and washed into one, and all exhale into the other. We detect the latter in what are called odorous bodies, and we might do so in all bodies, were it not for the obtuseness of our senses. Had human organs been fitted for micrographic observation, the color and taste of air had not

eluded them. The ceaseless streaming upward of every variety of vapor makes the atmosphere one of the most complex of compounds; yet the mixture is found to be made up of two ingredients chiefly—oxygen and nitrogen, with a very slight dash of water, and a much slighter of carbonic acid—a result, however, of approximate analysis. Further researches will lessen or enlarge the number of constituents, ascertain their qualities as well as quantities, and most likely disclose the means of producing among them instantaneous collapsion; i. e., will enable us to call into instant action the air's pressure on one side of a piston by destroying it at the other.

Could we by decomposition annihilate the air in a given space, or by some quick process displace it, we should have a power adapted to most of the purposes to which steam is applied, and to others to which it is inapplicable; a power as ready to act in a parlor as in a workshop, above the earth as beneath it or upon it, and one which can be invoked to any degree of intensity, from the suspension of a fly to the overthrowing of a mountain. Difficulties in the way present no formidable aspects, but rather court attempts to remove them.

We already know the capabilities of atmospheric pressure, since to it the first steam engines owed all their efficacy, and to it not a few are still indebted. It is scarcely possible to conceive a more glorious source of mechanical force than the soft, invisible, and quiet fluid in which we live and move; attending us everywhere, and ready to obey the slightest invocation, it would seem designed for a universal motor. An object of more legitimate and high ambition no chemist can desire to achieve, than that of economically and rapidly displacing air from a cylinder without introducing another substance for the purpose. Accomplish this, and human drudgery is at an end; ignorance and crime, our race's jailors, loosen their hold on their victims' throats, and slink into outer darkness.

THE OCEAN.

Not only the aerial ocean which encompasses, but the denser one that forms, so large a portion of our globe, is destined to become a laborer for man. Nothing is more fitful in its habitudes and variable in its intensities than wind. It is the symbol of capriciousness, and hence the more reliable and manageable forces of running waters have justly had the preference, and hence millwrights and manufacturers roam the interior for chutes under which to place the buckets of one class of wheels, while they husband brooks for whirling round the floats of others.

There are streams which, throughout their length, drive labor-saving machinery, but they and their accessories are tributaries to ONE in whose presence they shrink into insignificance. Nature, in her teachings, leads inquirers from little to larger things, from particulars to generals. It is so with hydraulic motors. In every branch of philosophy and art, one acquisition clears the way for and hastens the advent of another. Having turned rivers and rivulets upon our motive wheels, the restless ocean itself will in time become subjected to human vassalage, as well as fire, air, earth, lightning, &c. Adapted to ten thousand purposes, to propel all descriptions of stationary mechanism, it cannot much longer be left to expend its moments in vain. Washing all lands, its shores will become fringed with manufacturing mechanism, driven by ordinary and tidal waves, either directly or *through* the medium of compressed air, by the gravity of descending or the *upward* force of swelling surges, probably by all.

Steam cannot be too highly regarded, yet it is costly; atmospheric pressure, too, requires as yet expensive apparatus to excite and employ it; but the waves of the sea are open to the poor, and being restless, are ever ready to work. A simple device, then, by which to transmit their energy to revolving or alternating mechanism, is wanted; and a greater benefactor has perhaps not lived than he who best solves the apparently simple problem. It would be long ere the curtain of oblivion dropped over his name.

Till our times the human mind seems not to have sufficiently matured to attempt the conquest of such a power. There is no reason why it should not now be made to give motion to mills and animate looms and spindles. All force is derived from matter in motion; why then neglect the greatest of terrestrial moving masses? Three-fourths of the earth's surface ceaselessly surging to and fro, rising and falling, rolling on and lashing all shores, and lashing them in vain. It cannot, however, be long neglected. The searching, sifting, and daring spirit of philosophical enterprise will not rest until the chiefest and mightiest of visible motors which God has placed at our disposal be brought into the service of the arts.

There is no hazard in asserting that none of the ordinary modes of employing water as a motor are perfected. An interesting illustration of this is furnished in the reacting water wheel, which, till recently, has been little else than a toy in the lecture room. As exemplified in the turbine, the same principle has yielded eighty per cent. of the power employed, and in some cases is said to have run it up to near ninety: a result almost incredible, and one that strongly admonishes us critically to investigate every source of mechanical force, with a view to its economization. Prime movers are too precious gifts to be but half used up, under the constantly increasing requirements of civilization.

The turbine elucidates a truth which inventors, above all other men, should cherish. It is this: there is no natural force, no matter how discouraging or forbidding the circumstances under which it is exhibited, but what may, by appropriate mechanism, be turned to account. And so far from regretting the supposed difficulties in the way, they ought rather to be welcomed, since they invariably serve as keys to open new doctrines in science and art. In mountainous districts are falls of water far too high for overshot wheels, and in low lands sluggard streams glide on, too inert for undershots; but turbines have been impelled by falls of less than twelve inches, while others are worked under columns varying from fifty to four hundred feet.

EXPLOSIVE FORCES.

Repeated attempts to derive a useful motor from explosive compounds were made during the last century. No devices were matured, not because of insuperable difficulties to be overcome, but principally on account of the increasing popularity of steam. It was doubtful that any competing energy could stand before that agent; but now things are different. Steam engines have been greatly improved and extended, and the arts have reached a point where a more portable power has become greatly desirable. It is only as the requirements of advancing society present new exigences, and such as current forces cannot meet, that we begin to look seriously for others.

Though few have been developed, explosive forces are beyond question multitudinous, and include every imaginable quality and intensity. No systematic inquiry into their various natures and numbers has been undertaken—

it is not yet time for that—nor into the means of drilling them to useful labor. Many persons have supposed them untameable; that their fitful violence incapacitated them for working steadily as other inorganic servants do—an error, certainly. There is no active energy, revealed or to be revealed, no matter how refractory in its habits or paroxysmal in its manifestations, but will be subdued by man. It is his mission to make them all subservients. Give him time. Crumbling Cheops was not raised in a day, nor are the lasting edifices of civilization and science to be finished in a century. Some imagine their spires are already penetrating the clouds, while, in reality, it is their foundation courses only that are laid.

GUNPOWDER.

At periods, too remote to be ascertained with precision, explosive mixtures were used. Of these, gunpowder is best known. Others have passed away, while demands for it have been swelling at a fearful rate—fearful, since it has long been dedicated to destructive purposes, for which it is held of paramount necessity. The scourge of our race, it might have been a chief good; a precious gift of science, it has been prostituted to a purpose the most wicked that man can conceive, or evil spirits suggest.

So common and cheap as powder is, it is difficult to realize the value of a device that locks up the strength of giants in a few quiescent grains, and releases it at pleasure—a power that instantaneously dilates into a space two thousand times greater than it slept in. Instead of projecting missiles of death, it might, if properly employed, extend and refine every enjoyment of life. Had a tithe of the treasure and thought expended during the last three or four centuries on extending the range and effect of fire-arms, been devoted to the application of powder as a mover of machinery, society would probably have been equally advanced as it is, even if steam had not been subdued. Strange as the assertion may appear, gunpowder and its affinitives have in them elements calculated to contribute as great good to man, as they have heretofore engendered evil.

Gun-tow or cotton, the first of a new class of explosives, seems more promising than gunpowder. Neat, clean, light, and leaving scarcely any residua ingenious men are already engaged upon it. There is more virtue in a few bales than can be extracted from cargoes of coal and tuns of water. As with gunpowder, it requires no ponderous or complex machinery to disclose and transmit it. Like its predecessor, too, it has been seized by those who without compunction destroy human beings as vermin; and from its applicability to internecine work, it has received its pronomen. Cotton now clothes a large portion of the human family, for which purpose it is held in importance second only to food. If, besides this, it can be made to work for us, to relieve from debasing toil the millions that pass through life, tugging with brute force, straining their heart-strings, and gasping from exhaustion, a halo will gather round the head of him whose inventive skill compels it to do this, that will never vanish.

MEANS OF EMPLOYING EXPLOSIVES.

Some may ask, how are forces which present no transition between quiescence and flashes of rage to be applied? How deduce uniform

movements from fits of convulsion; or by what reins are these startling, impulsive steeds to be managed, and by what traces yoked? Answer. Present to engineers a more economical force than any they have, and they will not be long in finding out means of turning it to advantage. Withdraw all they have, except what they could make out of powder and cotton, and few years would pass away ere these were numerous as those in use. A little reflection will show that there is no serious obstacle to the practical solution of the problem. For example—what material difference is there between driving a ball out of a gun and a piston through a cylinder? The apparatus for both are very closely allied—in substance the same. Fasten two bullets to a couple of ramrods, and charge two guns with them—connect the upper ends of the rods with the extremities of a vibrating beam—fire off the balls alternately, without allowing them (by the play of the beam) to pass beyond the muzzles, and you have an engine differing but little from a high-pressure steam one, save in the moving force. A gun barrel is a working cylinder, the bullet a piston, and the rammer a piston rod.

In what manner neutralize the violence of such motions? By adapting the charge to the resistance, so that no more force be excited than can be turned to account. How bring the rushing ball or piston gradually to rest? (For, unless that is done, no machine could long withstand the shocks of pistons shot through cylinders). By making the upper parts of piston rods themselves into pistons of air condensing pumps, that when forced into their cylinders, the increasing resistance from the compressed air may bring them by degrees to rest—the subsequent expansion serving to drive them back to receive a fresh charge. In this way a reciprocating movement of one or more pistons may be safely kept up, and a continuous rotary one derived from it by any of the numerous methods of conversion.

Such examples may suffice to explain the practicability of explosive motors. There are few ingenious men but could devise several modes of employing the force of a ball, or of powder or cotton without it. Difficulties of construction and arrangement are nothing in the way of securing a good prime mover, whenever attention is fairly drawn to it. Every defeat with true genius is a *point d' appui* on which it plants itself to overcome new obstacles.

ELECTRIC MOTORS.

The belief is a growing one that electricity, in one or more of its manifestations, is ordained to effect the mightiest of revolutions in human affairs. In subtlety and power, in excitability, rapidity, and intensity of action there is nothing like it. Its complete subjugation may be held as the climax of conquests in art, the apex of ambition in science—so blessed and boundless, so surpassing all anticipations, are the seeming results that must follow. When, in addition to what it is now performing as a messenger—one swifter than those of the gods, and more reliable than the boasted Ariels of poets—it can be drawn cheaply from its hiding-places, and made to propel land and water chariots, animate manufacturing mechanisms, become an agricultural laborer, and a household drudge of all work, then we may begin to think the genius of civilization is vaulting rapidly toward the zenith.

Several years ago the discovery of *Electro-Magnetism* awakened sanguine expectations that in it would be found a prime mover so compact and energetic as to be adapted to general purposes. No sooner was the fact made known, that soft iron is rendered intensely magnetic by the galvanic or voltaic pile, than hosts of mechanicians in both hemispheres were at work endeavoring to transmit the enormous power thus developed to motive machinery. Though exhibited in a variety of apparatus, the principle by which motion is obtained from it is the same in all; one or more magnets are *fixed* and serve as fulcra on which others turn. Thus Professor Henry first produced reciprocating motion, by arranging an electro-magnet in the manner of a balance-beam above the opposite poles of two permanent magnets—keeping up oscillation by alternately breaking and renewing the connection with the battery.

Rotary motion is attained by so arranging two circles (or portions of circles) of magnets, one within the other, that the faces of those which revolve may sweep round those that are immovable, and as near as can be without touching. By a series of cut-offs, the stream of electric fluid is alternately let on and excluded, so that each face of a revolving magnet is pulled in succession toward each of the fixed ones, and as it passes is pushed away toward the next.

While in some machines permanent are employed in connection with electro-magnets, in others, the latter are only used. Change of polarity is abandoned in some, and with it the repellant force; the bars being rapidly magnetized and de-magnetized by opening and closing their connection with the battery.

In 1838, Jacobi propelled a small shallop with fourteen men, on the Neva, at the rate of four miles an hour, three against the stream. He had four fixed electro-magnets, and the same number of revolving ones, to which the axle that carried the paddle-wheels was attached. His battery, consisting of sixty four pairs of platinum plates, each presenting a surface of thirty-six square inches, was charged with nitric and sulphuric acids, on Grove's plan. Since then innumerable modifications of the apparatus have been devised; lathes have been worked, and articles of wood, ivory, and metals, turned; a printing press operated, and a locomotive weighing five tons propelled, &c., &c., But these experiments, interesting as they certainly were, have brought out no marked results, nor afforded any high degree of encouragement to proceed. It might be imprudent to assert that electro-magnetism can never supersede steam; still, in the present state of electrical science, the desideratum is rather to be hoped for than expected.

Great, however, will be his glory who in the face of these discouragements succeeds.

The difficulty is not in the mechanism for employing the force, but in the extremely short space through which it acts. This is so limited that the phenomenon may be considered something like the converse of cohesion: *e. g.* an electro-magnet with its armature in contact, had a lifting power of 1,700 lbs., but when the armature was removed one eighth of an inch, the weight supported was barely 15 lbs. The interposition of a film of tissue paper has reduced the power one half. By making a soft iron core play in the centre of a helix—like a piston rod minus the piston playing in its cylinder—an apparent increase of range is obtained, a stroke of twelve or more inches realized; but this is supposed to be colorable rather than real.

At the present cost of metallic fuel, electro-magnetism cannot become *commercially* valuable, nor in any of the ordinary applications of steam can it

come into competition with that agent—not even if the requisite acids could be had for nothing, since there is more virtue in a pound of coal than in five of zinc.

Either the science is not ripe for application, or experimenters have not got on the right track. It is not devices for transmitting the force that are wanted, but means of extending the range through which it acts. Should this be obtained, readier and cheaper means of exciting it will probably follow.

The talent for inventing new modes of employing forces is great, but that of discovering new motors, and applying them to the general purposes of engineering, is far greater. One is somewhat common, the other rare. A new power is now wanted, is looked for; and what a field of enterprise will its introduction open! Every department of mental and physical existence will be benefited by it. Steam has wrought gloriously, and equal changes for the better will be wrought by that agent which displaces it, or which takes a place beside it.

ATMOSPHERIC OR COMMON ELECTRICITY.

There are indications of a law by which every motor must come in its own order. If it appears before its time, it will partake more or less of the character of an abortion. It will be imperfectly developed, its habitudes not understood, and the means of controlling them, wanting. This was the case with steam, whose mechanical properties the ancients detected, yet they were not prepared for it. In their hands its application was confined to trifles, and even for them soon laid aside. Such was the case with explosive compounds also, and to some extent it is the case now with electricity.

That this piercing and potent energy is ordained to play a prominent part in the arts as it does in nature, is all but certain; perhaps as multifarious in its operations too. Already, it separates metals from their ores, and gilds our plate; in telegraphs, it annihilates time, and in electric clocks, measures it: as an element for artificial illumination, it is now being courted, and may, at no distant day be used to light up the atmosphere over cities, in place of myriads of petty tapers. For other purposes also, the most sagacious of spirits are endeavoring to subdue it.

But, if inorganic motors are to come in their turn, that is, according as preparations are made to receive them, or, in other words, not until a previous familiarity with their natures has fitted us properly to apply them, it is hardly to be expected that we should so soon realize what seems to be the highest, and which, of all earthly things, we, as yet, know least about. It is the part of philosophers to reveal principles—of mechanics to apply them; but philosophers, as yet, know little more about electricity than do artificers.

While some are sanguine of soon yoking this invisible steed in material traces, and compelling it to work as do grosser motors—others incline to the opinion that the chief of earthly conquests is not to be made so readily. Certes, when electricity is brought into man's service as a common worker, all that may come after must needs be subordinate. When this ubiquitous, exhaustless, imponderable, incorruptible something—agent, spirit, substance, or whatever it be—becomes so far subdued, men will have progressed, one would suppose, beyond terrestrial, and entered upon celestial physics.

The pursuit is, however, a legitimate one, and neither repeated nor long-continued failures can be attended with dishonor. Success is a matter of

time—if not now to be attained, it will be—must be. The difficulty with electro-magnetism—the short distance through which the force is felt—belongs, not to the ordinary phases of the fluid in Nature's exhibitions. She causes it to act through greater spaces than can ever be required in the arts; and as a further inducement for us to persevere, she shows its energy under circumstances where it might have been least suspected—circumstances it were well for inventors to study: we must first understand her operations before we can successfully imitate them.

Pervading all things, nothing is, and nothing moves without it. Recently, it has been detected issuing in showers from rushing steam; while a thimbleful of water is known to contain enough to shake both earth and heaven. Its dynamic effects are seen in leagues of prostrated forests—at other times in unroofing and overthrowing dwellings: its expansive power in splitting rocks and trees into shivers: sometimes, too, in forcing outward the sides of buildings. Three years ago, the stone steeple of a church was burst asunder during a thunder storm, the walls being dispersed in every direction. One hundred tons of stone were blown to a distance of thirty yards, in three seconds—exhibiting a mechanical force calculated to have exceeded that of over twelve thousand horses.

A power that does these things, and greater, only wants to be understood to make it turn our carriage, paddle, and mill wheels. There is enough to turn them for ever, can we but find out the means to tame it. It is sound philosophy, that all the mechanical performances of nature (not excepting that of lightning) are imitable, and also applicable to human purposes.

To show us what else it can do, Nature diversifies the experiment thus: thrusting down a portion of a cloud in the form of an elongated tube, till the orifice approaches the surface of the sea, tuns upon tuns of water visibly ascend into the nebulous reservoir above. When this is filled, the strange duct gathers itself up to its parent body, and, then the whole is borne away to fill the pitchers of Aquarius. Here we have the phenomenon of water beginning to boil and leap as the hose descends, impatient as it were to rush through it. When engineers become *au fait* in repeating similar experiments, overshot motive-wheels may become as numerous in deserts, as by the sides of rivers. In water-spouts, the process is open to observation from beginning to end—still it is an unsolved problem.

To conclude:—Notwithstanding those of bygone and the more successful inquiries of recent days, but exceedingly few of her secrets have yet been drawn out of Nature. Environed by her, it is but little that is comprehended of what she is doing above, beneath, about us; yea, with us and within us—little of the grand scheme of creation and of the principles and processes at work in it. Our wisest men are but pupils in normal schools—freshmen in their rudiments. True, we know much compared with the deplorable ignorance of the past, yet what we have acquired is only the A B C of either science or art. Those who fondly imagine the arts at their culmination, and steam the last of inorganic motors, would shrink with awe, could they contemplate the grandeur of human destiny, in an epoch of which our day is but the dawning.

And, certainly, whoever confers this splendid gift of a new motor on the world, will be ranked with the noblest of earth's sons. The goal is a tempting one, and the more so since the keenest spirits in two hemispheres are *striving* to reach it. We are ignorant who will receive the crown, but we *know* who will not, viz., those who pay divine honors to pelf, and whose us-

pirations never soar above the common objects of vulgar ambition. Generally, the rich revelations of science are made to those who love them for themselves, not for what they can be sold for. They come down to those who seek them, who, by industrial study and research, struggle to find them out, and who prize them when found, as expressions of Divine thoughts for the good of the species.

For months past, crowds have been hastening across every latitude, on their way to the newly-discovered realms of gold. An epidemic rages to gather and hoard that, which, except as a symbol, has little more value than its weight of inert sandstone or granite. A people's treasure is in useful labor; there is no wealth, and can be none but what it creates. Every good, great or small, is purchased by it. Savages with boundless territories and fertile lands, are indigent and often destitute because they work not. A single day's labor of a peasant or a mechanic, tends to relieve human wants and increase human comforts. It produces that which is not to be had without it, and to which tons of glittering ore can contribute nothing. In fine, there is no wealth but labor—no enjoyments but what are derived from it.

But, to those who are ambitious of ennobling themselves and really enriching their country, *placers* inexpressibly more precious than any to be found on the Sacramento, are invitingly open. Let them dig in THE MINES OF THE MOTORS, and they will bring to light, active, fruitful, and everlasting sources of true opulence.

VI.

PROPOSED APPLICATIONS OF THE PATENT FUND.

I. PUBLICATION OF THE SPECIFICATIONS AND DRAWINGS.
II. PREPARATION OF A GENERAL, ANALYTICAL, AND DESCRIPTIVE INDEX OF INVENTIONS.
III. INSTITUTION OF NATIONAL PRIZES.

PROPOSED APPLICATIONS OF THE PATENT FUND.

Of the disposal of the Patent Fund, patentees have ever been jealous; but if they have complained of drafts made on it to subserve other interests, it was because of their anxiety to have it expended in such a way as to meet the cordial assent of all classes of society: one associated with the interests and honor of all.

The Patent Office is a self-sustaining institution: its receipts exceed its expenditures, and have exceeded them for several years. The surplus money paid in by inventors, and known as the Patent Fund, amounted on the 1st of January, 1849, to $216,468\frac{1}{100}$. Of this sum $50,000 were appropriated by Congress at the last session toward defraying the cost of the additions to the building, recently commenced, and have been withdrawn on that account—a diversion of the funds which is believed by inventors to be unjust.

These additional structures are not required for the proper business of the office, but are intended to accommodate other branches of the government, and those better able to pay for them. After contributing $108,000 to erect the present building, it is deemed manifestly wrong to absorb what has always been considered the inventors' own fund, to increase the facilities of other departments. When the upper saloon of the present building (more than one third and by far the best part of the whole)—temporarily occupied by the collection of the Exploring expedition and the National Institution, is restored to the office, on the completion of the Smithsonian Institution to which the collection is to be removed—no further accommodation as regards room will be required by this bureau. The undersigned therefore asks, in the name of the inventors of the Union, a restoration of the sum withdrawn, and authority to devote the fund to purposes more immediately connected with the progress of science and art. The amount of the Patent Fund, January 1, 1850, was, as already stated, $169,505\frac{1}{100}$.

The fifth and sixth sections of the act of Congress, establishing the Smithsonian Institution, provide for the "erection of a suitable building for the reception and arrangement, upon a liberal scale, of objects of natural history, including a geological and mineralogical cabinet."

In the first annual Report of the board of regents, it will be seen that a building was commenced with this view, a part of which was specially designed, and has been constructed, to receive the "National Museum," *which* includes the collections now stored in the upper saloon of this *office.*

The building is so far advanced, that it is believed if ordinary effort be made, the rooms designed for the Museum can be sufficiently completed to receive the collections in the course of the present year, (1850,) when the hall which they now occupy may be restored to the office for the display of its models.

It is most desirable that Congress should act on this matter at the present session, since the cost of finishing the buildings now commenced, and the remainder contemplated in the original plan, will require appropriations, it is understood, to an amount varying between five and six hundred thousand dollars—so that, if the Patent Fund is to meet the demand to the utmost of its ability, it will be wholly swallowed up, and the cherished purposes of inventors with regard to it entirely frustrated.

There are several essential desiderata to make this bureau what it ought to be, and to some of them the Patent Fund, in the opinion of the undersigned, should chiefly be dedicated. Probably by no other channels of expenditure can the public and inventors themselves be so *immediately* and *enduringly* benefited—by none can more certain and rich returns be realized. Among them are—

I. PUBLICATION OF THE SPECIFICATIONS AND DRAWINGS.

In several respects this bureau, in its organization and practice, is in advance of patent offices in other countries. According to antiquated fooleries about "divine rights," by which everything belonged to kings and nothing to the people—not even the fruits of their ingenuity—inventors abroad still pray for and accept patents as "special acts of the sovereign's grace." With us the insulting and debasing proposition is effectually ignored. Not subjects, but freemen, inventors here claim and receive patents as of right—their own right.

Nor are they subjected to the claims of numerous offices, at each of which the ingenious of some lands are required to call and pay enormous fees for no services rendered,* or for services next to none, ere the royal permission

*This practice, and also one relating to legalized "expedition fees," are elucidated in the recent report of a committee appointed to inquire into the British Patent Laws, with a view to their improvement and the removal of abuses.

"After the patent bill is prepared, the patent is forwarded through the Signet and Privy Seal offices? YES. That part of the proceeding is regulated by the statute of Henry VIII., is it not? YES, *entirely, and which was passed for the purpose of creating fees*—the 27th of Henry VIII., chapter 11, which requires that every patent should be brought to the clerks of the Signet and Privy Seal, and go through certain stages. Up to that stage, I believe, it is a matter of practice which the particular offices could control. From that stage it is a matter regulated *by an act of Parliament, passed simply for the sake of the fees, and is a very great hardship.* If you have two names, you have the expense very much increased—three, and so on, without any corresponding benefit or protection; in fact, the offices are absolutely useless.

"Is it not stated in the preamble to that statute, that the object is to increase the fees to the clerk at the Signet and the clerk at the Privy Seal Office? YES—it states that the clerks of the Signet and Privy Seal give their daily attendance for great and weighty affairs, and have no fees, 'other than cometh and groweth of the said Signet and Privy Seal.' And that statute was passed simply as a means of paying the clerks, by requiring every grant to pass through their hands. They receive fees which are not specified on those grants."—*Evidence of Thomas Webster.*

"Are the proceedings at the Signet Office and the Privy Seal Office anything more than formal with regard to new inventions? *Nothing more than formal*, but they are dilatory. Great complaint has been made, and with reason, at the confinement to one seal-day in the week. The rule is to deposite the bill on Thursday at one o'clock in order to be in time for the seal on Friday. If it passes over one o'clock on Thursday, it is delayed a week. The Privy Seal, however, may be obtained in a day, *on payment of five guineas as an* 'EXPEDITION FEE.'"—*Evidence of William Spence.*

for a patent to issue can be obtained—a part this of that gigantic system of wrong by which the industrious have been taxed to support the vicious and idle—a system originating in times when the masses were acknowledged serfs, and cherished till it pervaded every industrial profession, and hung, as it still hangs in many lands, a dark spectrum overshadowing human enterprise.

Our example in establishing a single and a moderate fee, and dedicating whatever surplus funds may accrue to the benefit of those from whom they were received, has awakened inquiry abroad, and led to comparisons and investigations which promise to result in modifications of exactions that have often reduced genius to beggary, and legal technicalities that have sent not a few of earth's purest spirits to harbor with maniacs. Any step toward the freedom of the arts—the universal emancipation of ingenuity—is matter of rejoicing to the friends of progress, be it taken when it may.

In our extended Union one patent covers every state; but with some governments an invention, although new to every part of the country, can only be secured for the whole by taking out separate patents for separate sections—a practise acknowledged to have been instituted, and still clung to, for the purpose of extorting from inventors additional fees.

A foreign journalist, representing a city deeply interested in manufacturing improvements, "regards with satisfaction the recommendation of the committee on the Signet and Privy Seal Offices, to abolish the system of enforcing, for the sake of fees, separate patents for each of the three kingdoms."

"Any one," says the writer, "who is accustomed to glance at the pages of our scientific, and particularly of our mechanical serials, must be struck with astonishment and admiration at the inconceivable ability, manual skill, and even genius, continually striving to urge on the wheels of material improvement. There is no scheme too brilliant or too daring, no difficulty of execution too intricate, to baffle or to daunt them. In the air, the water, and the earth, these spirits are continually toiling, wasting health, and strength, and means, in some effort or another. It is little enough that when the object is attained, some interloper should not be suffered to step in, appropriate the invention, and intercept the profits. The law has wisely pronounced that enterprise shall have its reward in fourteen years' monopoly of any new and original invention. That is not much, but public policy will allow no more. It has always, however, been a hardship that an extravagant expense is requisite to procure a patent. Separate writs must be taken out for England, Scotland, and Ireland, and hundreds of pounds are swallowed up in procuring them. Not seldom a poor man is obliged to resign all the profit of his discovery from pure inability to take out the protection. That ought not to be; and no sophism has sufficed to convince us that any expense beyond the minimum possible cost is advisable in such cases. It is indeed said, that the charge prevents the inventors of trifles or insignificant plans from taking out patents. But it is as likely to prevent a very different class. It is a test utterly unsatisfactory in every respect, and should not be suffered to exist, especially when the abolition of protective laws has placed our own skill and industry in competition with those of the whole world. We therefore look with satisfaction on this recommendation."

The superiority of our system consists also in the rejection of intricate legal forms, so that every inventor of ordinary capacity may make out and pass through the office his own papers, without the intervention of attorney or

agent:—also in the requirement of models, and their free examination—in the information and advice, verbally and by circulars, gratuitously given—access to the office library—and in the practice of examining into the novelty and value of devices and discoveries for which patents are asked. Not a week elapses without ingenious men being prevented from spending their money on patents, by what they see and learn here. Every applicant in person is advised to look through the models, examine the specifications and claims on file, and the published reports of the office, before making application: it is perhaps superfluous to add that many who follow the advice see they are anticipated, and make no application at all. Surprised to find themselves on beaten tracks, instead of ranging, as they supposed, through untrodden fields, they have their attention turned to more promising directions, and a future waste of time and means prevented. But few inventors can afford the expense of travelling to and from the capital to make such inquiries.

But after all that can be said in favor of our practice, in one essential particular we are in the rear, viz:—*In the publication of descriptions and drawings of inventions patented.* No greater boon could be conferred on inventors than an annual volume or two devoted to this purpose. For want of such a work, an incalculable amount of intellectual and physical effort—of time, money, material and ingenuity—has been wasted within the last twenty years; while every day is adding to it and to the number of those who spend the best part of their lives in devising and maturing what has already been done. In no country do the ingenious labor under the disadvantage to so great a degree as in ours, although in none can sources of information be of more immediate and lasting benefit.

The publication of the specifications and drawings of patented inventions has for many years been practised in England, France, and most of the European states, as a part of the general system, legalized, for the protection of inventors and the encouragement of useful arts. In England the publication is conducted by private enterprise; but in most other European states, it is obligatory, sometimes on the patentee, and sometimes on the government. From the etymology of the term, *Letters-patent* are letters which lie open; and in law the grant of the same is equivalent to publication; but in effect it is hardly so, as the archives of public offices are difficult of access, and the parchment in the hands of its possessor, is generally a sealed document to the world. The insertion, therefore, of suitable descriptions and illustrations, in some public journal, is necessary, to apprize the public of the progress of inventions, to prevent infringements through ignorance or mistake, to avoid occasions for contests about priority of invention, and to save inventors the trouble and expense of wasting their energies upon what has already been secured to another. It also stimulates improvement, and awakens commendable emulation.

The following is an extract from the patent laws of Bavaria. Article 59. "Extracts from this Register [the official register of patents] ought to be inserted periodically, in the most widely-circulated gazettes, in the journals of industry, and in the advertising papers of the provinces. The Minister of the Interior ought to take care that the most extended publicity be given to the description of the objects invested with a patent, immediately after the expiration of the first three years—to be computed from the day of publication of the patent granted—in order to contribute the utmost possible to encourage the spirit of invention and extension of industry.

"The publication of discoveries, &c. at the term above fixed, can not be

postponed by the Minister of the Interior, but in extraordinary cases, and for well-grounded reason—the patent sufficiently protecting the patentee against the infringement and violation of his privileges."

In some of the European states, the publication is not ordered until the expiration of the patent, that the public may then be informed of what has become their property. In others, advertisement or publication is enjoined upon the patentee immediately after his patent is secured.

In the following countries specifications and drawings are published at the expense of government:—

Bavaria—three years after the grant.

France—after the first annuity is paid.

Belgium—after the expiration or forfeiture of the patent.

Netherlands—same as in Belgium.

Wurtemburg—optional with the government.

Roman States—after expiration.

In some cases all patents are published; in others, it is discretional with the minister; and, in others, certain inventions or classes are directed to be withheld.

The bill for the amendment of the patent laws, introduced at the last session of Congress, proposed to authorize the Commissioner of Patents to publish such specifications and drawings as might be deemed expedient in the Journal of the Franklin Institute.

The importance of some medium of communicating to the public full descriptions of patented inventions was urged upon Congress by Messrs. Ellsworth and Burke; and its attention to the subject is again invited.

II. PREPARATION OF A GENERAL ANALYTICAL AND DESCRIPTIVE INDEX OF DISCOVERIES AND INVENTIONS:—

An urgent desideratum in mechanical literature—the want of which is increasingly felt, day by day. Expensive as it will be, the world of inventors must have it. Of sufficient moment for the joint undertaking of enlightened nations, every people should feel the duty of contributing their appropriate share to a *précis* of the arts, science, and manufactures of the planet; a work that, above all others, would elucidate and serve to perpetuate the essential and progressive elements of civilization. It is due to remote posterity, that an account of what has been done, up to our day, should be transmitted, that it may be known how far the intellect of the species had expanded in the nineteenth century—to what extent the real sources of physical and mental elevation had been disclosed, and how far turned to account.

How much useful knowledge is lost by the scattered forms in which it is ushered into the world! For want of a condensed exhibition of what is known, how many solitary students spend half their lives in discovering what had previously been repeatedly ascertained! This thought, or something like it, of Buffon, is vastly more applicable to inventors than to *littérateurs*—to our times than his. Knowledge is increasing at an unprecedented rate, but not near so fast as the means for circulating it. New books are being multiplied by tons, new thoughts, comparatively, by scruples; so that unless measures are taken to gather together and condense the useful matter in printed sheets, most of it will be lost by dilatation;—the best ideas will become *diluted*, and, at length, drowned in oceans of words.

An American section or chapter of the proposed compilation, would be of

high and immediate value to this office, and to every inquiring mind in the Union. A gift also to the ingenious of the rest of the world, it would be acknowledged by similar presents sent us in return. With the information it should contain, applicants for patents would become their own examiners. Each could put his hand at once on what might otherwise require years to find, if found at all. Hence, before embodying his conceptions in expensive forms, he would ascertain their novelty, or want of it, and be led to proceed with confidence, or to abandon or modify his schemes.

However serviceable to applicants the appointment of examiners has proved, the system of search is necessarily defective for want of such a work. It is impossible in every case that comes before them, to wade through the numerous treatises, journals, foreign and domestic, encyclopedias, &c., and the piles of specifications and caveats in the office—their whole time would not suffice for this; yet to arrive at a safe conclusion, the contents should be known to them. Patents have been issued for devices already figured and described in popular journals. A general and analytical index only can prevent this. For want of it, the labors of the examiners result in no permanent advantage to the public, the office, or to inventors, other than those on whose inventions they pass. No results are recorded; and hence (except when the memory of an examiner supersedes the necessity) the same routine of reference to serial and standard works, to models, specifications, &c., is without ceasing, repeated.

The process is not unlike that of supplying water to cities located on the banks of rapid streams, by ladling it into vases borne through the streets on the heads of men and women; while, with the contemplated lexicon, it might be likened to the more philosophical and cheaper one of making the current itself send the fluid through tubes into every room of every dwelling, instead of hiring people to bring it by driblets in. A sum equal to one year's salary of the examiners ($16,000) would go far to bring about the change; the work once completed, fully posted up, and a copy placed in every city, town, and district library, would in each place be a fountain of knowledge to which inquisitive spirits might ever have recourse.

It would save half the examiners' time, and supersede three-fourths of an irritating correspondence, arising from disallowed claims. Till it is undertaken, the examining corps will have to be increased with the increasing business of the office; when done, no such reinforcement would be wanted.

It would be difficult to overrate the saving of time, money, material, and mental expenditure that would accrue to the country if the ingenious had the means of readily ascertaining what has been done in the lines of their speculations. A very inadequate idea may be gathered from the number of applications for patents rejected and suspended yearly for want of novelty or merit. In 1848 there were 968; and in 1849 over 1,400. Yet cases that come under the notice of this office constitute but a small part of the labors of those who sacrifice years in unfruitful researches, for lack of information which an index of inventions would give them.

In a pecuniary point of view, such a work is therefore most desirable to this office, to inventors, and the public at large. When made accessible to popular reference, it will be the saving of millions. No state paper could surpass it in importance, nor in lasting value.

Till it is done, a majority of applicants for patents must continue to meet with sore disappointment. The only safe rule with them is always to make themselves acquainted with what has been attempted, before incurring any

serious outlay. They should never presume that their devices have not entered other heads than their own, until, by a searching inquisition on every hand, the presumption remains in their favor, unimpaired. No better advice than this can be given them. But how are they to follow it? Nineteen twentieths have few or no reliable sources of information within their reach; and not one in a hundred can afford the expenses of a visit to Washington, and a residence there, for the purpose of consulting the office records and library.

When such a work as the one contemplated shall be compiled and put in print, patents for perpetual motions will cease to be asked for. Those then inclined to follow these phantoms would see that others had pursued them through the same deceitful tracks as they themselves. But the rule of the office is now to decline an examination of papers relating to such devices, unless accompanied with working models, that power-generating machines may no longer impeach their specifications—a rule really favorable, though seldom acceptable to applicants, since it requires them to solve the impossible problem before spending their money to patent it—in other words, requiring them to exhibit a machine actually giving out what was never put into it.

If Congress decide that the work shall be undertaken, it should be confined to American discoveries and inventions, at least till they are collated, including of course, patented devices, up to the time when the regular publication of specifications and drawings is begun. Both for economy and utility, the descriptive matter should be concise and expressive—pages should be compressed into lines. When illustrations are required, a few strokes of the graver would, in hundreds of cases, be enough with, and often without, a dozen lines of letter press.

It is evident that the work should be placed in charge of a person or persons peculiarly fitted for it by previous habits and studies. Much care and consideration should be exercised in definitely determining on the plan and details. Not less than three individuals could be advantageously occupied upon it—the compiler, an assistant, and a draughtsman. Essential aid might be contributed by the examiners. I respectfully propose that six thousand dollars be appropriated from the patent fund for the purpose of beginning the work, and that the same amount be authorized to be drawn yearly to continue it, till otherwise ordered by Congress.

III.—INSTITUTION OF NATIONAL PREMIUMS FOR NEW DISCOVERIES, ETC.

The present times will ever be memorable as the opening era of the inorganic and latent motors—one that has brought with it a knowledge of the true destiny of man, which has sent its influence throughout the entire circle of human pursuits, and immeasurably extended human prospects. With it has come the true interpretation of creation's pages; for the arts and science, so long neglected, are now recognised as "rivers of life" to an otherwise sluggish and sterile world. Civilization, which before was a stagnant lake, now pours out fertilizing streams that widen, deepen, and grow more rapid as they advance.

It is our duty, above that of all other people, to assist in this renovation of the race. To profit by our privileges as we ought, we should surpass others both in science and art; for what are liberal institutions worth, if they enfranchise not and enrich not the soul? Deliverance from external thraldom is only preliminary to intellectual emancipation, in which freedom's divinity *is ultimately* to be felt.

To foster the development of new discoveries in science and improvements in the arts should be among the acknowledged aims of legislation. Assuredly no subjects connected with sectional, national, or mundane advancement, with the progress of a people or the species, with the lowest or highest purposes of existence can compare in importance with them.

The question arises—How is this to be done?

Among the people of old there was one that played their part in the world's drama with such spirit that the sympathies of every succeeding age have been with them. Remarkable for original and vigorous thinking, they were surprisingly active and ingenious. Imagination in them was not crippled by superstitions nor obsolete forms of thought entailed by proclamation and statute. They thought better than their contemporaries and indulged in higher aspirations—results of their political organization. The freest of civilized people, they were necessarily the most inventive. To what else are we to ascribe the purity of taste and brilliancy of genius displayed in the arts they most cherished? The seat of science and of freedom, republican Greece shines in history, a star amid general gloom.

In one thing we are clearly behind her, viz: In the inducements held out to her aspiring sons to make themselves worthy of her. No higher proof of the superior wisdom of her statesmen perhaps can be quoted, than an institution which for a thousand years urged her citizens to attempt noble deeds, or what were then deemed such.

The programmes and fetes of the Olympian games furnish a principle by which all people, imbued with the appreciation of true national glory may profit. Deemed to have done immortal honor to their country, successful candidates were crowned with chaplets, their portraits were suspended in temples, and their statues erected in public walks. To perpetuate their fame, their names were recorded in archives; stipends and often salaries for life were settled upon them; and further still, altars, and even offerings, were dedicated to them as to demigods.

If history is written for us to profit by its examples, why not organize something of the kind in honor of a better class of aspirants? Can we not elicit and maintain as generous an enthusiasm in the furtherance of the useful arts as did the Greeks of old to cherish pre-eminence in muscular performances? There is a wide difference between physical accomplishments that expire with the individuals, and permanent inventions which yield lasting happiness to society—and there should be some difference in their rewards. We have a political Olympiad; why not add to it an institution to foster emulation among a higher order of Olympionices—of men whose peaceful exploits reflect honor on the country and age they live in?

How is it that while all the world has endorsed the apothegm—'Honor fosters the arts'—we have not been anxious, like people of old, to put it to use? The fact is, most of our maxims are learned by rote; they are sometimes on our lips, rarely in our memories. We give a hollow assent to sententious truths, which, when they are most wanted, are least thought of; and naturally, because of their pith not being seen nor their force felt.

As yet less has been done for inventors by government here, than has been accorded to them in other parts of the civilized world. In some they have their statues, and are in other respects honored. An effort is now made to wipe away this reproach—not by soliciting money from the treasury, nor putting the public to any expense whatever.

INVENTORS' PREMIUM FUND.

Under the conviction that Congress will not deny to the class of citizens from whom the Patent Fund has been received, the accomplishment of their wishes, and believing that the following proposition will meet the approbation of the wise and good of all classes, and be consistent with sound policy, the undersigned suggests that ONE HUNDRED THOUSAND DOLLARS of the Patent Fund be held sacred and intact as a permanent Inventors' Premium Fund: from the interest of which, rewards in money may be distributed once every four years, for the most important additions to science and the useful arts.

It is presumed that the most parsimonious could not object to returning in this way a portion of surplus money to those who paid it, upon the condition of the public receiving for it a new and increased value. The proposition, denuded, is simply one asking of Congress permission for the ingenious to promote the honor and interests of their country at their own cost.

Rich beyond all preceding ages, the present one has witnessed accessions to mechanical philosophy that are revolutionizing human affairs and extending human hopes far beyond the horizon which bounded ancient vision. To assist in further disclosing the resources of science and art, is so consonant with the aspirations of American genius, that the consecration of the sum named to this purpose would certainly meet with general approbation.

At six per cent., the accumulative interest during four years on $100,000 would amount to $26,247 69, which sum might be awarded quadrennially in sums proportioned to the merits and magnitude of the discoveries and inventions submitted for premiums.

At seven per cent., the amount would be swelled to $31,179 60.

To carry out the plan, a board of examination and award would be desirable. It might consist of thirteen members, and be made up thus: the Secretary of the Interior; the Commissioner of Patents; the Superintendent of the Coast Survey; the Secretary of the Smithsonian Institution; the Professor of—— of the Military Academy, West Point; the President of the National Institute; the Director of the National Observatory.

The remainder selected from the philosophical and mechanical associations in different sections of the Union, such as—the President of the Mechanics' Association of Boston; the President of the Mechanics' Institute of New York; the President of the Franklin Institute of Philadelphia; the President of the Mechanics' Association of Baltimore; the President of the Mechanics' Association of Cincinnati; the President of the Mechanics' Association of Charleston, S. C. Or such other institutions might be represented as the wisdom of Congress may direct.

Assembling in Washington a sufficient time before the day or days for distributing the prizes, it would be their duty to examine the subjects offered for premiums, ascertain their merits, and determine the amounts to be awarded to the author or authors of each.

The reputation of such a body of men would, it is believed, be a sufficient guaranty against the introduction of favoritism, or any other unworthy motive of action. Above all personal and political influences in making the awards, their decisions could hardly be other than such as the public would approve. The eyes of thousands and tens of thousands would be on them; their verdicts would be subjected to general criticism, and be applauded or condemned by the world. Guided by inflexible justice, they would be respected and revered as were the twelve who presided at the great quadrennial festival at

Elis; and eventually the honor of a prize would be more sought for at their hands than the value of the prize itself.

A genuine inventor cares little for what the world calls wealth. Mammon is not the first nor the final cause in his philosophy. Ambitious of disclosing new facts, let him bring in fresh contributions to the stock of mechanical discovery, and the treasures of India are nothing to him—and in reality *are* nothing in comparison with the riches he reveals. With him it is an affair of honor more than of profit.

The 5th day of March—the day following each Presidential inauguration at the capitol—it is presumed, would be a suitable one for the presentation at the Patent Office of the premiums to successful competitors. Should the project be sanctioned by Congress, the first presentation might be announced to take place on the 5th of March, at noon, of the year 185–, under the direction of the Secretary of the Interior, to whose department the Patent Office belongs.

By associating these scientific festivals with the beginning of each administration, the occasion of awarding the premiums would be heightened in interest, and be witnessed by citizens from every section of the Union, and also by strangers from abroad. Appropriate addresses by distinguished citizens might form part of the ceremonies. We should thus hold a kind of political and scientific Olympiad, celebrated with fetes in unison with the age—with competitions between intellectual instead of physical athletæ.

Those bearing off the chief prizes under each administration would have their names associated with it on the pages of history—for history henceforth is to be that of beneficent rather than destructive achievements—and of some of them, also, it perhaps will be said, "The honors of genius are eternal."

Should the whole sum at the disposal of the board at each period of distribution not be used, from the want of sufficient importance or merit in the devices or discoveries submitted, no inconvenience could result, since larger amounts would be on hand to meet extraordinary claims on subsequent occasions.

Once established, and its beneficent effects experienced, accessions to the fund would in all probability be received in donations and bequests of patriotic citizens, of whom not a few would find it a congenial medium for promoting by their surplus wealth their country's glory.

A system of national prizes, thus established, would, it is believed, create an epoch in the history of American arts, and would cherish in the largest and most laborious class of citizens an ambition, with impulses as pure as any that move the human bosom. It would do more, for it is such things that contribute to the prosperity and duration of nations. It is well enough to talk of the penetration of prominent statesmen and legislators of old, but not one of them perceived the true means of elevating their people. The producing classes they despised, and the industrial arts were deemed beneath them.

Had premiums been offered at Olympia for useful discoveries in science and art—had they there brought out grist and saw mills, spinning frames and power looms—their names had come down in substantial forms, and been associated with cherished reminiscences through all generations. The history of the past would have presented very different aspects to those we are compelled to contemplate—Greece had not fallen before Macedon nor

Rome, and the colonies of Attica had probably been at this day as numerous and widely spread as those of any other people.

Had the idea once occurred to the more advanced of the ancients that inanimate forces are the paramount agents of national prosperity and strength—that only as they are developed can a people rise in civilization—that savages are such because they use no powers but their own—that semi-barbarians are indebted for what progress they make to the labor of animals, and the more advanced to currents of wind and water—and that when the more efficient but less obvious energies of the gases are employed, agriculture, commerce, manufactures, and all the great physical transactions of life can be carried on with a tithe of the expenditure of human muscle—the world would not now be struggling, as it is, with ignorance and misrule.

If any should still be found to object to the organization of the proposed institution, they might be reminded that it would add a link—a bright and not a weak one—to the chain of national brotherhood.

PREMIUM MEDALS.

Another wise custom of old—wise because founded on a knowledge of the human heart, and of the springs of human action—was to strike medals in honor of remarkable men; hence the names and features of classical conquerors, statesmen, orators, historians, philosophers, and poets, that have come down. Similar compliments to professional eminence, good or bad, have been conferred by all modern nations. Let it be our part to present characteristic medallions to those whose labors tend not to depress and destroy, but to bless and exalt the race.

In Europe those that excel in the fine arts are complimented with casts and medals of Raphael, Rubens, Canova, &c., and with us, kindred ones for similar purposes have been struck, bearing the portraits of Stewart, Allston, and others. Why not adopt the same plan for the promotion of the Industrial and Productive Arts? I respectfully propose that three sets of dies be prepared for producing, in bronze or other metals, MEDALLIONS of FRANKLIN, FULTON, and WHITNEY, to serve as prizes and accompaniments of prizes, for valuable contributions to mechanical science.

Two, three, or more profiles might, if deemed proper, be impressed on each medal: thus Whittemore might be associated with Whitney, and Fitch and Oliver Evans with Fulton. Godfrey might be added to Franklin; and were it deemed proper to introduce profiles of the living, one still more appropriate might be named.

A series of medallions of eminent American inventors or mechanics, thus commenced, would be continued, and eventually form a new chapter in medallurgy, as instructive and interesting as any of which that science can boast.

It may be a question with some, whether those who patent their inventions should be permitted to enter them for premiums. In the opinion of the undersigned, no restrictions of the kind should be imposed: the object sought to be accomplished is to hasten the advent of discoveries advantageous to the general good, not to limit benefits which their authors may legally and righteously derive from them.

PREMIUMS FOR WHAT OFFERED.

Instead of publishing a schedule of prizes and devices, it would perhaps be expedient to leave the field entirely open, so that any remarkable invention or contribution to the arts, of sufficient importance, might receive an appropriate acknowledgment. There can, however, be no impropriety in suggesting a few of the subjects to which the attention of inventors might with advantage be directed.

An invention by which land can be worked with equal facility *without animals* as with them, is one. In attempting the solution of this problem, it might be well if inventors would avoid copying too closely the action of the plough, and turn their attention to equivalent, though not analogous, processes for digging into, raising, turning, and breaking the soil: remembering also (what looks very like a *sine qua non* in locomotive ploughing) to bring the points of resistance rather under the power than in the rear of it, as in cattle-ploughing, or so far in advance of it as some projectors would have them.

If the thrusting action had not been so completely identified in idea with the plough, it had long ago been modified, at least for some kinds of earth. But the implement has become so sanctioned by time, is rendered so venerable by antiquity, and revered as the symbol of the first and last of arts, that reforming spirits have kept away from it, hesitating to propose any radical change in so universally cherished a favorite. The fact may be assumed that in its stereotpyped forms and features, the plough belongs exclusively to the cycle of animal motors. It cannot go beyond them without undergoing more or less of a metamorphose. When inorganic prime-movers take it in hand the rectilinear will most likely give place to a rotary and to a paring or semi-paring action.

There is no difficulty in combining the effect of the plough, harrow, and pulverizer, or clod-breaker, in the same machine, for soils the most tenacious. A single or a series of cutters or prongs at the ends of vertical revolving shafts (on the principle of oblong boring machines or such as are used for removing the blank surfaces of engraved blocks of wood) might be carried over a field with very little resistance to its progress, while each cutter, equivalent to a plough, would work away the most adhesive soil—paring it off in shavings of any determined thickness in front, and leaving them well broken and commingled behind:—cutting away roots in its path by piecemeal and opening the soil thoroughly for the air's percolation (a most essential part of an intelligent ploughman's treatment of his land) instead of successive rows of solid slabs, which the present implement, by its wedge-like operation, compresses and turns up.

By obvious devices, implements of this kind could readily be made adjustable to surface or to the deepest subsoil ploughing; while the power required, even in the latter operation, would hardly ever equal that consumed in ordinary applications of common ploughs.

The earth, hitherto tortured by ignorance and then denounced for barrenness, is about to receive better usage. A new epoch in agriculture is clearly at hand; brought near by the labors of chemists and inventors, to whom the glories of a conquest extending over the planet and replete with unalloyed blessings to the entire human race will belong. Husbandmen acquiring a knowledge of chemical and mechanical laws, will cease to violate them, and with a tithe of their present toil reap abundant and certain harvests; certain,

because blight, mildew, and every other disease incident to plants, will become eradicated and famine be unknown. It will not be long ere this and other terrible natural scourges will be acknowledged as the unavoidable penalties of neglecting to employ the powers given us to ascertain and remove the causes of them.

A premium of $10,000 for an economical LOCOMOTIVE PLOUGH, or even a higher sum, would, in a national view, be money well laid out.

If the device be not realized by steam, it will be an early corollary of the next motor.

INCREASING THE SPEED OF OCEAN STEAMERS

Is another desideratum. These vessels constitute a marked feature in modern navigation, but rapid as naval travelling has come to be by them, it will unquestionably be carried to a much higher standard. The first locomotives did not average five miles an hour. In 1825, a European writer placed the maximum velocity at six, and ridiculed the promulgation of "such nonsense, as that we shall see locomotive engines travelling at the rate of twelve, sixteen, eighteen and twenty miles an hour." In 1829, fifteen miles was atained —soon after, that speed was on one occasion nearly doubled. Within the last seven years, twenty miles was deemed the highest consistent with safety; subsequently, thirty was reached—then thirty-five was supposed to be the extreme limit, but recently, a mile a minute has been attained, and is kept up in some English express trains. Even seventy miles an hour has been reached. The average speed of railroad travelling will certainly come up to sixty. So with oceanic locomotors:—they have been gradually growing faster; and, admitting in their case, to a greater extent than air opposes to locomotives, an increased resistance with increased speed, there is no reason to suppose anything like the limits has been attained. They have run up from four, to six, eight, ten, twelve, to about fifteen, their present average, and must continue to run up.

I propose, that a premium of $20,000 be offered for improvements by which a vessel shall make three consecutive trips across the Atlantic, at an average speed of twenty miles an hour; and another of $20,000, for those by which twenty-five miles shall be done. Such premiums will tend to put the enterprise and ingenuity of our citizens still more on the stretch, and urge them to shoot ahead of the present craft, either by decided improvements in propelling apparatus or by the introduction of new principles of propulsion.

PRIZE FOR A NEW MOTOR.

Steam, the only force artificially evolved, it is admitted, has surpassed the brightest foreshadowings. The heart of modern society, it has quickened and animates the most distant members. In political and moral renovations, its pulsations are not less perceptible than in scientific and mechanical.

But steam is ordained to be superseded to some extent by, or at least associated with, other prime movers. To stimulate the inventive genius of our countrymen, and endeavor to secure to the republic the imperishable honor of giving a new mechanical power to the world, it is respectfully proposed to Congress to authorize the offer of a premium of ONE HUNDRED THOUSAND DOLLARS, to be drawn from the treasury or from future accumulations of the Patent Fund, to him who within the next——years shall render *Electricity* in any of its forms an economical, efficient, and general prime mover:

Or who, within the same period, shall discover and make known the means by which *atmospheric pressure* can be profitably employed in the propulsion of sea-going vessels, and land-locomotives, or as a general impeller of fixed machinery; by some rapid mode of expelling air from a cylinder or of annihilating it under a piston:

Or, who develops an *explosive*, or other prime mover, applicable, energetic, and economical, as the vapor of water, and whose exciting and transmitting mechanism is less massive and costly than that of the steam engine.

[It is cargoes of fuel, tanks of water, and huge boiling caldrons, with their heavy and dangerous adjuncts, in steamers and locomotives, that are wanted to be got rid of.]

Were the amount offered a million of dollars, it would be none too much; and were it drawn from the public coffers, no very strong objection could be brought against it, since the community would be benefited by the stipulated consideration a thousand fold.

It is not probable that this premium would be claimed under several years, so that no inconvenience from an early withdrawal from the Patent Fund, if from that source Congress determine to offer it, of so large a sum, need be anticipated; but were it to be awarded to-morrow, so much the better for us and our race.

VII.

HISTORICAL NOTICES OF INVENTORS AND PATENTEES.

FACTS and incidents connected with the early history of steam engines and steamboats on this hemisphere, and such as relate to the development of other chief elements of civilization, are rich in interest, and will become more and more so as time rolls on. There is no doubt that many may be gleaned from private documents, old pamphlets and newspapers, but which, like memorabilia of the revolution, if not gathered soon, will be irrecoverably lost. Embracing notices of early inventors and the first patentees, it is deemed an appropriate duty of this office to collect and preserve them. I therefore propose to incorporate such as can be procured, in the annual reports, to which they will impart increased value, at least in the estimation of inventors, and yet add but a very few pages to each. An illustration of what is intended is furnished in the subjoined documents relating to

JOHN FITCH.

1. A description of his boat, elucidated by a cut, both communicated by him to the Columbian Magazine.
2. A pamphlet written by him entitled "The Original Steamboat," &c., from a copy in the library of Peter Force, Esq. With the postscript, it occupies thirty-four pages.

A Description and Figure of John Fitch's Steamboat, by himself.

To the Editor of the Columbian Magazine:

PHILADELPHIA, December 8, 1786.

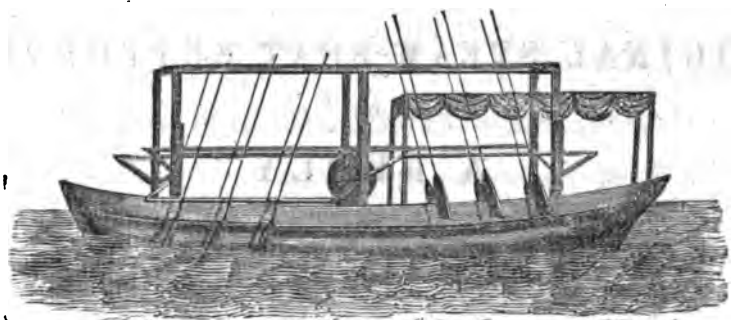
SIR: The reason of my so long deferring to give you a description of the steamboat has been in some measure owing to the complication of the works, and an apprehension that a number of drafts would be necessary in order to show the powers of the machine as clearly as you would wish. But as I have not been able to hand you herewith such drafts, I can only give you the general principles. It is, in several parts, similar to the late improved steam engines in Europe, though there are some alterations. Our cylinder is to be horizontal, and the steam to work with equal force at each end. The mode by which we obtain what I take the liberty of terming a vacuum, is, we believe, entirely new, as is also the method of letting the water into it and throwing it off against the atmosphere without any friction. It is expected that the engine, which is a twelve-inch cylinder, will move with a clear force of eleven or twelve hundred weight after the frictions are deducted; this force

is to act against a wheel of eighteen inches diameter. The piston is to move about three feet, and each vibration of the piston gives the axis about forty evolutions. Each evolution of the axis moves twelve oars or paddles, five and a half feet, which work perpendicularly, and are represented by the stroke of the paddle of a canoe. As six of the paddles are raised from the water, six more are entered, and the two sets of paddles make their strokes about eleven feet in each evolution. The cranks of the axis act upon the paddles about one-third of their length from the lever end, on which part of the oar the whole force of the axis is applied. Our engine is placed in the boat about one-third from the stern, and both the action and reaction turn the wheel the same way.

With the most perfect respect, sir, I beg leave to subscribe myself,

Your very humble servant,

JOHN FITCH.



Plan of Mr Fitchs Steam Boat.

THE

ORIGINAL STEAM-BOAT SUPPORTED;

OR

A REPLY

TO

MR. JAMES RUMSEY'S PAMPHLET:

SHEWING THE TRUE PRIORITY OF JOHN FITCH, AND THE FALSE DATINGS, &c. OF JAMES RUMSEY.

PHILADELPHIA:
PRINTED BY ZACHARIAH POULSON, Jun.,
ON THE WEST SIDE OF FOURTH STREET, BETWEEN MARKET AND ARCH STREETS.
MDCCLXXXVIII.

PREFACE.

AGREEABLY to a promise made in the Independent Gazetteer, I now present to the public a reply to the pamphlet published by Mr. Rumsey of Virginia,—and, as I have no matter to conceal, or disguise, and wish my readers to have a full and fair view of the whole controversy, I have re-printed and annexed Mr. Rumsey's pamphlet, which will discover to every impartial person who will take the trouble to examine the subject, that he hath no sort of just pretension to the claims he hath exhibited. His skill in the mechanism of a steam engine, may possibly be greater than mine, and in the article of condensation, I freely acknowledge he is my superior, having acquired the art of *condensing* (with the dash of his pen), one *whole year* into the compass of *six days*.

JOHN FITCH.

Philadelphia, 10th May, 1788.

THE ORIGINAL STEAMBOAT SUPPORTED, &c.

IT is the duty of every man not only to avoid the commission of a crime, but so to conduct himself through life as to bear the strictest scrutiny.

In a pamphlet published by Mr. James Rumsey and lately circulated in this city, as well as probably in other states, I am charged as the perpetrator of crimes attrocious in their nature, but of which my conscience fully acquits me. It is an exercise of malevolence in the extreme, thus publicly to prefer charges against an innocent person without previously knowing or inquiring for the defence of the supposed offender, and shows an inability in the accuser to support his charges. Unfortunately for Mr. Rumsey, I trust we are now before an impartial public, where justice unbiased by party or undue influence, will decide between us. Conscious of my conduct, in the prosecution of this business, being that of an honest man, it is incumbent on me to recite the circumstances, and facts relative thereto.

I confess the thought of a steamboat, which first struck me by mere accident about the middle of April, 1785,* has hitherto been very unfortunate to me; the perplexities and embarrassments through which it has caused me to wade, far exceed anything that the common course of life ever presented to my view. After pondering some days on the thought, I made a rough draught, but not daring to trust my own opinion too far, I consulted Mr. Daniel Longstreth, the Rev. Nathaniel Irwin, and sundry other gentlemen of Bucks county, Pennsylvania.

About the beginning of June, 1785, I went to Philadelphia, and shewed it to Dr. Ewing, Mr. Patterson, and other respectable characters in the city, from whom I met with no discouragement. In June and July I formed models, and in August laid them before Congress, as will appear on their files. In September I presented them to the Philosophical Society, as per certificate.

No. 3.

PHILADELPHIA, 1785.

September 27th, 1785.—At a special meeting of the American Philosophical Society, a model accompanied with a drawing, and description of a machine for working a boat, against the stream, by means of a steam engine, was laid before the society by John Fitch.

At a meeting of the American Philosophical Society, on December 2nd, 1785.—A copy of the drawing and description of a machine for working a boat against the current, which some time ago, was laid before the society by Mr. John Fitch, he this evening *presented* to them.

Extract from the minutes,

SAMUEL MAGAW,
One of the Secretaries.

In October I called on the ingenious Mr. Henry of Lancaster, to take his opinion of my drafts, who informed me, that I was not the first person who had thought of applying steam to vessels; that he had conversed with Mr. Andrew Ellicott, as early as the year 1775, and that Mr. Paine, author of Common Sense, had suggested the same thing to him in the winter of 1778; that some time after, he (Mr. Henry) thinking more seriously of the matter, was of opinion it might be easily perfected, and accordingly made some drafts, which he proposed to lay before

* Vide No. 1 and 2.

the Philosophical Society, and which he then shewed me, but added, as he had neglected to bring them to public view, and as I had first published the plan to the world, he would lay no claim to the invention. The following I have been favored with from Mr. Ellicott.

No. 4.

BALTIMORE, April 26th, 1787.

I do hereby certify, that early in the year one thousand seven hundred and seventy-five, Mr. William Henry, of Lancaster, conversed with me on the subject of *steam*, and intimated that he thought it might be advantageously applied to the navigation of boats.

(Signed) ANDREW ELLICOTT.*

From Lancaster I went to the Assembly of Virginia, first waiting on Governor Johnson, of Maryland, who notwithstanding the letters he has since written in favor of Mr. Rumsey, acknowledged a merit in my invention, and that it ought to be encouraged, as will presently appear. During my journey through Maryland, in October, I passed through Frederick Town, and every where published my plan. In Virginia, I waited on his Excellency General Washington, who, in the course of conversation, informed me that the thought of applying steam was not original, that Mr. Rumsey had mentioned steam to him; but nothing that passed in the conversation with General Washington had the least tendency to convey the idea of Mr. Rumsey's relying on steam, and General Washington's letter, page 10, in Mr. Rumsey's pamphlet, clears up the matter—for the General himself did not conceive any such thing. Knowing that the thought of applying steam to boats, had been suggested by other gentlemen *long before*, I left his Excellency General Washington with all the elated prospects that an aspiring projector could entertain, not doubting but I should reap the full benefit of the project; for although I found that *some* had *conceived* the thought before, yet I was the first that ever exhibited a plan to the public; and was fully convinced that I could not interfere with Mr. Rumsey, otherwise the known candor of General Washington, must have pointed out to me such interference. I immediately applied to the Legislature of Virginia, for assistance, to execute my plan, who signified their wish to encourage my designs, but that the state of their finances prevented it. The then Governor of the state Patrick Henry, Esq., received from me an obligation with provision, that if I procured in that state, a sale for one thousand of my maps of the N. W. part of the United States, at 6*s.* 8*d.* each, I should exhibit a steamboat on the waters of Virginia, within nine months, or forfeit and pay to the State of Virginia £350, as appears by the following certificate:

No. 6.

I certify, that John Fitch has left in my hands a bond, payable to the Governor for the time being, for £350, conditioned for exhibiting his steamboat, when he receives subscriptions for 1000 of his maps, 6*s.* 8*d.* each.

November 16th, 1785.

(Signed) P. HENRY.

I then returned to Maryland and acquainted Governor Johnson of my expected assistance in Virginia, and that I intended applying to the Assembly of Maryland, then sitting, to promote and patronise my scheme. Governor Johnson gave me the following letter to General Smallwood, the then Governor of the State:

No. 7.

FREDERICKTOWN, November 25, 1785.

SIR: Mr. John Fitch, of Bucks county, in Pennsylvania, called on me in his way to Richmond; he has gone through a variety of scenes in the back country, which has enabled him to collect a knowledge of a great part of the new States, on which and other helps he has made a map useful and entertaining. His ingenuity in this way strongly recommends him. But his genius is not confined to this alone; he has spent much thought on an improvement of the steam engine, by which to gain a first power, applicable to a variety of uses, amongst others, to force vessels forward in any kind of water. If this engine can be simplified, constructed, and made to work at a small expense, there is no doubt but it will be very useful in most great works, and amongst them, in ship building. Mr. Fitch wants to raise money to make an experiment on boats. The countenance that he has met with in Virginia, he hopes, will enable him to do it. He wishes, also, to make other experiments, and is willing to enter into engagements to apply a large proportion of the sales of his maps, his principal fund. I believe his passion for this improvement will be ample security for his applying the money in that way. All that I have to request of you, sir, is, that you will give him an opportunity to converse with you. You will soon perceive he is a man of real genius and modesty; your countenancing him will follow of course.

I am, sir, your excellency's most obedient and most humble servant,

(Subscribed) THOS. JOHNSON.

His excellency Governor SMALLWOOD.

Favor of Mr. FITCH.

* Vide Mr. Henry's certificate, No. 5.

From hence it plainly appears that Governor Johnson could not, at that time, have any idea of my scheme interfering with Mr. Rumsey's, as seems to be now insinuated in that gentleman's letter to Mr. Rumsey, No. 14 of his pamphlet.

I attended the session of the legislature about three weeks after receiving this letter, and on my petition for assistance to execute my plan, they made me the following report, or nearly in these words, as may appear by examining their minutes: "However desirous it is for liberal and enlightened legislatures to encourage useful arts, yet the state and condition of our finances are such that there can be no advance of public money at present." From this report it is proved beyond all doubt that the Assembly of Maryland did not conceive my plan the same as Mr. Rumsey's. Finding that I was undoubtedly the first person in America that could be termed the inventor of a steamboat, either agreeably to custom or equity, I thought it prudent to apply to the different States for the exclusive privileges for the emoluments of such invention, which were granted by New Jersey in March, 1786, by Delaware, New York, and Pennsylvania in the winter and spring following, and by Virginia in October, 1787.

I have, from the time of my first thought, pursued my scheme with unremitted application, without a suspicion of an interruption, until the circulation of Mr. Rumsey's invidious pamphlets, the contents of which I now find it necessary next to take under consideration, not doubting but that the design and tendency of that production will be a sufficient apology for the plainness with which I shall treat it.

Mr. Rumsey says, in page 2, that "in the month of September, 1784, he exhibited the model of a boat to his excellency General Washington, at Bath, in Berkeley county, calculated for stemming the current of *rapid rivers only*, constructed on principles very different from (his) present one. Satisfied of the experiment of her making way against a rapid stream by *the force of the stream*, the General was pleased to give me a most ample certificate of her efficacy." Here it is to be observed that no mention was made to General Washington of *steam*, at the time of such exhibition; the principles upon which the boat was propelled were entirely unconnected with, and distinct from, steam, being simply a model propelled by water wheels, cranks, and setting poles—a mode which was many years ago tried on the river Schuylkill by a farmer near Reading, but without success. From an exhibition of this plan it was that Mr. Rumsey procured the certificate from General Washington, and on that certificate were Mr. Rumsey's laws founded. In his petitions to the several legislatures he prayed for no exclusive right for the use of steamboats, neither did he make mention of steam to their committees, or even suggest an idea of the kind: as proof of which I offer the following petition to the Assembly of Pennsylvania, the certificate from General Washington accompanying it, and the certificate of Manuel Eyre, esquire, who was one of the committee of Assembly who reported in Mr. Rumsey's favor.

No. 8.

I have seen the model of Mr. Rumsey's boats, constructed to work against streams, examined the powers upon which it acts, been eye-witness to an actual experiment, in running water of some rapidity, and give it as my opinion (although I had little faith before) that he has discovered the art of working boats by mechanism and small manual assistance against rapid currents; that the discovery is of vast importance, may be of the greatest usefulness in our inland navigation, and if it succeeds, of which I have no doubt, that the value of it is greatly enhanced by the simplicity of the works, which, when seen and explained, may be executed by the most common mechanic.

Given under my hand at the town of Bath, county of Berkeley, in the State of Virginia, this 7th of September, 1784. GEORGE WASHINGTON

No. 9.

To the honorable, the Representatives of the State of Pennsylvania, in General Assembly met:

GENTLEMEN: Whereas your petitioner has formed a plan for facilitating the navigation of rapid rivers, he therefore doth propose to construct a certain species of boats of the burden of ten tons, which shall sail or be propelled by the combined influence of certain mechanical powers thereto applied, the distance of between twenty-five and forty miles per day, against the current of a rapid river, notwithstanding the velocity of the water should move at the rate of five miles per hour and upwards, with the burthen of ten tons on board, to be wrought at no greater expense than that of three hands. And as a premium of so useful an invention, your petitioner prays for an act to pass this honorable house granting to your petitioner, his heirs and assigns, the sole and exclusive right of constructing, navigating, and employing boats constructed upon his new invented model, upon each and every creek, river, bay, inlet, and harbor within the limits and jurisdiction of this commonwealth, for and during the term of ten years, fully to be completed and ended, to be computed from the first day of January next: provided always, that the legislature of this commonwealth may, at any time within the term aforesaid, abolish the exclusive right herein prayed for, by the payment of —— pounds in gold or silver. And your petitioner, as in duty bound, shall pray. JAMES RUMSEY.

The foregoing is a true copy of the original petition remaining on the files of the General Assembly, and read in the house November 26th, 1784.

J. SHALLUS, Ass. Clk.

No. 10.

PHILADELPHIA, the 6th May, 1788.

This may certify that I, the subscriber, was in Assembly for the year 1784, and was appointed one of the committee to report on Mr. James Rumsey's petition for his boat to go against the streams of rapid rivers, and that there was no mention nor any idea held up to the committee that it was to be propelled by the force of steam.

(Signed,) MANUEL EYRE.

Now I ask, whether it does not amount to a positive proof that Mr. Rumsey had no sort of reference to or dependence on steam? General Washington says: "It is so *simple* that it may be executed by the most *common mechanic*;" which certainly his excellency would not have said of a steam engine—a machine that has cost me two years to understand and complete. If we examine the petition, we shall find that it confirms the General's idea of simplicity; for Mr. Rumsey says, "It may be wrought at no *greater expense* than that of *three* hands;" plainly indicating that the *expense of fire* was not in contemplation. And to put the matter out of all doubt, Mr. Eyre declares, "*There was no idea* held up to the committee that it was to be propelled by *steam*."

All Mr. Rumsey's laws were obtained, in consequence of his model, shown to General Washington at Bath, which, as I have said, was nothing but water wheels, cranks and setting poles; therefore he could have no pretension to the use of steam, under those laws. With the same propriety his claim might extend to every power and every machine in the United States, as soon as any man had invented one that would suit his purpose; so that, upon his plan of law making, no other man would be safe in expending his money, but all must be swallowed up by his pretendedly ambiguous laws. But I am happy in knowing, that *his laws* as well as *his claims* cannot interfere with *mine*; for, had he professed any reliance on steam, or any intention to apply it to his boats, he certainly would not have neglected inserting so important a part of the scheme in his petitions to the different legislatures—nor would he have prayed to be invested with the exclusive privilege to use boats constructed on such different principles from those he really intended to pursue. In Mr. Rumsey's act passed in Pennsylvania, it is styled, "The exclusive right of constructing, navigating, and employing boats built and to be built on his new invented mode." And this new invented mode, viz: cranks, water wheels and setting poles, is all he was entitled to under that law. Can it be supposed that the legislatures would not have included steam in their laws if they had been informed by Mr. Rumsey that it was his grand dependence, the essential, the vital part of his scheme, as he now professes. That they had no such intimation given them is very evident from their encouragement to me; and the laws since passed are the fullest proofs of the received meaning of Mr. Rumsey's petitions, viz: that they had no connection with steam. And that Mr. Rumsey did not think himself misunderstood must certainly be granted, because he made no objection to any of my petitions, as interfering with his laws, which, agreeable to his own declarations, were founded on principles very different from a steamboat. That he had no claim to steam under his laws is evident, from his confession in page 4, line 31, where he says, "I find my idea of steam was *nearly matured* before steam had ever entered his head, by his confession to Governor Johnson, viz: April, 1785." Now can it be supposed Mr. Rumsey had made considerable *improvements* on steam engines in 1784, or that he had obtained laws securing a right to the use of steam to boats, when, at the time of his petitioning for, and the passing of those laws, he confesses his idea of steam was not *matured*.

He says, in page 3, line 1, "In the course of that fall and winter, (of 1784,) he made progress in some steam engines"—and page 16, line 7, of Governor Johnson's letter, "I think in October, 1785, you told me you relied on steam for your first power, and wished me to promote your having some cylinders cast at my brother's and my works—the attempt did not succeed." Speaking of General Washington, the Governor adds, "But the General seems to have thought it an *immatured idea that he did not imagine you then relied on*;" viz: in November, 1784. These two last acknowledgments on the part of Mr. Rumsey, must destroy the facts alleged in the first, viz: that "He made progress in steam engines in the fall and winter of 1784." For the information given to General Washington, in confidence, respecting the boat, was such that the General "did not think he then relied on steam;" which is fully confirmed by his making use of the General's certificate to the Assemblies, wherein the discovery is treated as being "enhanced by its simplicity, and may be executed by the most common mechanic"—which surely no person would say of a steam engine.

His application to Governor Johnson for castings for a steam engine, is insinuated to have been in October or November, 1785, which I must deny, and refer to the Governor's own letter for the proof; being confident that no such application had been made to that gentleman by Mr. Rumsey, *previous* to my obtaining the letter of recommendation to Governor Smallwood. But even had it been true, it goes no further back than October or November, 1785, which was the very time I was publishing my plan through Pennsylvania, Maryland and Virginia, and was near three months after the time I laid it before Congress. And yet this attempt to have a cylinder cast at Governor Johnson's works, in October or November, 1785, is the first essay towards bringing forward a steam engine that is offered in proof, admitting it to have been at the time Governor Johnson supposes, which I cannot allow, for reasons I shall presently offer in addition to what I have already said on this head. Then how are we to

reconcile the assertion of Mr. Rumsey's having made considerable progress in steam engines in the "fall or winter of 1784," when it appears his first attempt (by this account) was not made until after October or November, 1785, as mentioned by Governor Johnson's letter. I shall hereafter show, to a demonstration beyond all possibility of doubt, that this same engine, said to have been completely made in Fredericktown, in December, 1785, *was not begun* until March, 1786. On comparing Governor Johnson's letter, sent under my care to General Smallwood, dated November 25th, 1785, (a considerable time after I first explained to him my model, and acquainted him of my intentions of pursuing the scheme,) with his letter to Mr. Rumsey, dated December 18th, 1787, it must unavoidably call in question the *memory* or *candor* of the writer—the *latter* I most certainly ought to acquit, and should have been happy had I obtained the least *explanation* on this head, when I lately made a journey to his house, expressly to procure it. Possibly it may still be received. If Governor Johnson knew and believed the legal priority of Mr. Rumsey's claim to a steamboat, and was entrusted with his secret, how was it possible he could have encouraged a man "*of real genius and modesty*" (as he was pleased to term me) to proceed on an experiment, which, terminate as it would, must inevitably end in loss and disappointment. For, should the experiment fail, which was then thought very doubtful, the small fund which I should raise by the sale of my maps must likewise fail—for I was to expend it in Virginia, as appears by Governor Henry's certificate, page 5. Should the experiment succeed to the utmost of my wishes, I should suffer more severely, not in my money and time only, but in my reputation—and meet the treatment of a man trespassing on the rights of a fellow citizen, who had a law in his favor.

Had Governor Johnson, at the time he encouraged me, known the priority of claim to be fairly and justly in Mr. Rumsey—had he been *then* in possession of his secret—or had he believed any title vested in Mr. Rumsey to the exclusive use of steam, under the law of Maryland, so recently passed in his favor, the Governor certainly would not have requested a gentleman of General Smallwood's rank to countenance me—not only to trespass on the rights of Mr. Rumsey, but to violate a law which, as Governor of the State, he was bound to support. Another circumstance corroborates my assertion of misrelation of facts as to time.

It will be recollected that Governor Johnson's letter, recommending me so very minutely and warmly to the patronage of Governor Smallwood, was dated 25th November, 1785; and in his letter to Mr. Rumsey, the Governor says, "In October or November, 1785, you told me you relied on steam for your first power, and wished me to promote your having some castings at my brother's and my works—the attempt did not succeed. I considered myself under an obligation to secresy, 'till in the progress of making copper cylinders in Fredericktown, *some time after*, when I found that the designed purpose of the cylinder was a *subject of pretty general conversation*." Now the Governor's letter in my favor was dated 25th November, 1785, and the whole machinery is sworn to have been completed on the 1st December following, only *six days* after the time of my getting this letter of recommendation—and as the cylinder was a subject of "pretty general conversation," I could not have been kept in ignorance by the Governor, from his "obligation to secresy," because it was no longer a secret at Fredericktown.

The thing was impossible in its nature, that the cylinders and copper works should have been making, and a subject of general conversation in Fredericktown on the 25th day of November, 1785, the time I was obtaining my letter of introduction to Governor Smallwood in that very town, and must have heard it myself, if Governor Johnson had been so disingenuous as to conceal it from me, which is absurd to suppose; for I made *my* business publicly known in that town; and, therefore, if Mr. Rumsey's cylinders were the subject of general conversation, I must have heard it from every quarter: therefore, it clearly follows that the conversation about casting of the cylinders, the obligation of secresy, and the general conversation about the design of the cylinders in Fredericktown, could not have happened in the year 1785. If Mr. Rumsey had made Governor Johnson his confidant "in October or November, 1785," it is highly improbable that he would so far have deceived Mr. Rumsey and me as to encourage my pursuit of a similar nature, within so short a time as six days of its being completed. And it is equally improbable that Mr. Rumsey should have communicated this secret, and requested his assistance in procuring castings *immediately after* my being with the Governor, as there was not time for it, the engine being sworn, as I have said, to have been completed *six days* after that visit. Then the following conclusion may be safely drawn, that Governor Johnson did at some *subsequent* day (so long after as that he forgot the letter he had given me) offer to assist Mr. Rumsey with castings, which not succeeding, an application was made to coppersmiths in Fredericktown, the ensuing spring, who, in the course of the summer 1786, delivered their work to Mr. Rumsey. About *this time* it was that the matter became a subject of "*general conversation*;" and if *winter* stopped the putting the whole machinery into motion, as sworn to by Messrs. Barns & Morrow, it was the *winter* of 1786, which is *long after* my boat was built, and my model of a steam engine completed. Of this my readers will soon be fully convinced. And a further weighty proof is, that as Mr. Rumsey professes his hurrying on his engine was on account of my setting up pretensions, it cannot be believed that he would suffer my petition to lay before the Assembly of Maryland, and be reported on in my favor, about the 20th December, 1785, *nineteen days* after he says his boat and engine were finished. Mr. Foy, the member from Fredericktown, must have told the tale, and laid in a claim for his countryman. But I repeat it again, that I was in that very Fredericktown, on my way to the Assembly, in the *fall* of 1785, *every where publishing* my scheme, and no engine was begun there during

that year, nor until March following, as will be fully shown. But before I come to my proofs I wish to confute him out of his writings.

Let me pursue his explanation still further, and ask what could be the use of *secrecy* in this business, if Mr. Rumsey, as he alleges, was secured in the use of the invention by law? Could he expect any countenance from the public for a scheme wrapped up in secresy, and which is confessed by Governor Johnson to have remained so until after I had published *my plan*, both in Maryland and Virginia. Mr. Rumsey and his confidential friends might have died, and then no advantage could have arisen to the community; and until such advantage was publicly imparted, certainly nothing could be expected from the public.

In page 16 he inserts part of a letter from General Washington, in answer to his of the 10th March, 1785, "It gives me much pleasure to find by your letter that you are *not less sanguine* in your boat project than when I saw you at Richmond, and that you have made such *further discoveries* as will render them more extensively useful than was at first expected." But still it is plain that the General only alluded to the setting pole plan, for in his answer to Governor Johnson, (even after my petition was before the Assembly of Maryland,) he *still* thought that Mr. Rumsey had "no reliance on steam." The General's saying that he thought Mr. Rumsey's idea of steam was "*immature*" in November, 1784, (the time they were at Richmond,) is a proof that Mr Rumsey's "*being not less sanguine*" must have alluded to his *setting pole* scheme, because no man can be said to be *sanguine* in any thing of which he has but an "*immatured* idea; and "*further discoveries*" will not apply to steam, because *steam* could be no *new* discovery, and was mentioned to the General at Richmond: nor is any thing mentioned of steam in the General's letter, at least in the extract. It is reasonable to suppose, if steam had been the dependable discovery, it would have been treated on more largely, and have produced a more pointed answer. The truth is, Mr. Rumsey placed no dependence on steam until my plan came forward and his own had failed. Conscious of the weakness of his claim, and the futility of his arguments to support it, he found that something more was necessary than merely an "immatured idea;" therefore, to add weight to his plea, he endeavors to establish himself under the solemnity of oaths, and attempts to prove that the machinery for his steam engine was executed in Baltimore and Fredericktown, so as to be completed and put together on the 1*st of December*, 1785. These solemn and positive declarations are contained in the depositions of Charles Morrow and Joseph Barns, (No. 11 and 12 of his pamphlet,) who are probably interested in the scheme. The reader will please to examine these depositions—they are produced to support facts, which he is conscious *ought* to have existed at the time they specify, otherwise his pretensions would consequently fall. These two witnesses testify to absolute facts, and yet affix different periods of time for one and the same transaction. Page 13, line 14, of Charles Morrow's deposition, he says, "About the first of December, 1785, it appears to the said Charles that the *whole* of the machinery was ready to be fixed to the boat, which came down to the falls of Shanandoah for experiment, but the ice then commencing prevented it for the winter." And line 28, of the same deposition, he says, "In the spring of 1786 the machinery was put on the boat and the first trial made, said Charles being on board." Page 15, line 11, of *Joseph Barns's* deposition, he says, "In December, 1785, it was *put on the boat* at Shanandoah falls." These different declarations, or different times affixed, at which the machinery was *put on the boat*, of themselves tend much to destroy the validity of their oaths; for the time the machinery was put on board must have been a fact so notorious that it could not admit of a mistake, in a mind properly impressed with the importance of an oath. In page 10 and 11, William Askew swears that Mr. Rumsey's machinery will not weigh more than eight hundred pounds, and that he is well convinced it may be made for £20. It is a well known fact that of Mr. Rumsey's machinery the greatest part must consist of copper or brass, such as cylinders, tubes, cocks and valves, together with curious wrought iron. Now eight hundred pounds (were it all made of *iron*) could not cost less than double the sum. As this evidence is not brought to prove any thing about Mr. Rumsey's *priority*, it is of no importance, and the absurdity it contains might have been spared. Whether *his* machine or *my* machine is best, is nothing to the purpose. I have been daily altering, and never watched *his* motions and blunders, as it is evident he did *mine*. He, it seems, made a secret of his doings, whilst mine were open to all the world.

It is proper I should not pass over this part of my work without acknowledging that I have been greatly indebted to the assistance of my ingenious friend, Mr. Henry Voight, of this city; who has uniformly, from my first undertaking to build a boat, afforded me valuable hints; and has united with me in perfecting my plans. To his inventive genius alone, I am indebted for the improvement in our mode of creating steam; a thought which struck him above two years ago, the drawing having been shown to several persons; for we *never made a secret* of any part of our works; but a fear of departing from old established plans, made me fearful of adopting it, until I had found by his invention of *creating steam*, that a *condenser* might be constructed on the same principles, (viz., a spiral pipe or worm) only by reversing the agent, for the best way of applying *fire* to evaporate *water into steam*, must also be the best way of applying *cold water* to condense *steam*, that is, the bringing the greatest quantity of fire into action upon the greatest surface of water—or the contrary; and we had an additional inducement to study this subject, because the common way of fixing boilers, required so great a load of brick work, that it overloaded our boat. Therefore, the first thought that must occur to every man, attempting to *raise* steam on board a boat, must be to acquire that method which would require the least *weight*. Since Mr. Rumsey has been in town, I have been told that he says I have got *his* mode

of creating steam; whether that be the case or not (or whether he has *got mine*) I do not at present know. But as both Mr. Rumsey and Mr. Voight laid their drawings and plans before the Philosophical Society the same day, it will appear how far they are alike. And Mr. Voight made a prior entry of his plans, in the Prothonotary's office in this city. If there should happen to be any similarity between them, it would be nothing surprising; having the same load on both their minds, they both sought relief; and, as sick persons, lacking a doctor, chance might have led them to the same man; and I had an undoubted right to apply every medicine that suited the disorder—but I will proceed with the pamphlet:—

In page 17, Henry Bedinger says, that Mr. James Rumsey informed him in or before the month of March, 1784, that he intended to give trial to a steamboat, and he believes he mentioned such intention of Mr. Rumsey's in Kentucky, which seems to have been a breach of honor, as it must be supposed Mr. Rumsey gave it to him in confidence; for he treated his idea of steam as a *secret* to Governor Johnson, long after; thus on the disclosure of this friend, Mr. Rumsey builds a charge against me, as having filched his scheme in Kentucky; this, like his other charges, is founded in falsehood, for it is a well known fact, that I have not been in Kentucky since the year 1781. The depositions of George Rootes, No. 8, and Nicholas Orrick, No. 10, testifying to his having informed them, in the year 1784, of his *projecting* a steamboat is quite useless, for reasons already given. Messrs. Henry and Paine *projected* it before him; and if bare projection was sufficient to build a claim on, I have no doubt but there are people now in their graves, whose heirs might set up more early claims than either of us. If Mr. Rumsey was in 1784 projecting a boat to work by steam, with a view of carrying it into actual execution, why did he not apply for the use of steam in his laws? The reason is plain,—General Washington gives it for him; it was "an *immatured idea*, and on which he thought he *did not rely*." I must therefore contend that these depositions lose their weight, and the whole of his conduct proves to a demonstration, that he could not have been engaged in making steam engines at the time mentioned by those witnesses, with a view of applying them to his boat. In page 20, No. 18, he inserts a paragraph of a letter said to have been written by a Mr. Daniel Buckley, near Philadelphia, by which he fixes the time of his applying himself to the "perfecting his steam engine with much ardor." In part of said inserted extract, speaking of me, he styles me "*a Mr. Fitch, of Philadelphia*;" now this letter, if the facts it recites are true, must have been written *after* the 17th of April, 1786, and not in 1785, as insinuated by Mr. Rumsey, for I was not an inhabitant of Philadelphia till after that period; nor did I ever hear that Mr. Rumsey was employed in making a *steamboat*, until long after that time; consequently I could not have used any expressions about it until after April, 1786. This is a very important part of the prevarication, and carrying the air of great plausibility, I must beg my reader's close attention to it, as I shall prove it to be false. Page 3, he says, "I wrote to General Washington the 10th of March, 1785, that I intended applying both powers (meaning steam as one) to build a boat after the model of one he saw at Bath, &c., and as I could gain truth only by successive experiments, *incredible delays* were produced, &c. I bore the pelting of ignorance and ill-nature with all resignation; until I was informed some dark assassins had endeavored to wound the reputation of his Excellency, and the other gentlemen who saw my exhibition at Bath, for giving me a certificate. The reflections upon these worthy gentlemen gave me inexpressible uneasiness, and I should certainly have quitted my steam engines, *though in great forwardness*, and have produced *the boat for which I had obtained the certificate*, for their justification and my own, had not a Mr. Fitch come out at *this critical minute* with his steamboat; asserting that he was the first inventor of steam, and that I had gotten what small knowledge I had from him, &c." Now this embarrassment being confessedly subsequent to the letter to General Washington just mentioned, viz., 10th March, 1785, the letter asserted to have been written by Mr. Buckley, is incontrovertibly fixed between this date and the 1st of December following, the time sworn to for completing of the steam engine; therefore, as Mr. Rumsey quitted his setting pole scheme and "pursued the perfecting his steam engines with increased ardor (page 3,) on *the receipt of this letter*, it becomes of moment to ascertain its exact date; and I shall show that this letter, which set Messrs. Rumsey and Barns to work in such haste, and with such "increased ardor," was not written until near a year after the time it is pretended, and the copper works said to have been made in 1785, were not begun until 1786, so that this machinery, completed so briskly, and sworn to have been on board in December, 1785, has made a jump of just twelve months, in order to persuade the public into a belief that Mr. Rumsey's works were begun time enough to supplant mine. "At *that critical minute*," says he, "came out a Mr. Fitch, asserting I had got what small knowledge I had from him." At *what* critical minute, I ask?—Mr. Rumsey's third page will tell us. In March, 1785, he informed General Washington by letter, that he *intended* applying steam to boats; in December following, Messrs. Barns and Morrow swear the boat was ready; and his exhibiting this boat, he confesses, was hurried on by the intelligence received from Mr. Buckley; consequently this work and this "increased ardor" was *subsequent* to the date of the letter from Mr. Buckley. Then, if I can fix the time of Mr. Buckley's writing the letter, I shall establish a certain fixed period at which Mr. Rumsey acknowledges his works were not on board his boat; and I felicitate myself in being able to do it so incontestibly, as to prove from his own writings that he has given *false dates*, and assigned *false reasons* for his movements. He knew at the time of inserting that quibbling account, that it would not bear the light, and therefore did not dare to give *the date* of Mr. Buckley's letter, wrote at that "critical minute," for Mr. Buckley's letter would have shown that this "critical minute" was *not in 1785, when they swear* the steamboat was ready, but in the summer of 1786, full twelve

months after I had made my plans public, and was procuring patterns for my present cylinder, and had made a complete model of a steam engine, in brass and iron. I have been at the pains of walking 66 miles to Pequa and Lancaster to see Mr. Buckley, that I might obtain an additional proof (to the many others I shall produce) that Mr. Rumsey has transposed the order of time, and antedated facts. Mr. Buckley frankly told me all he knew of the matter, and fixed the time of writing his letter, *so circumstantially*, to have been in 1786, and not in 1785, that not a doubt can remain—and it will further appear from the certificate he has given me, that the coloring as to fact, as well as to date, has been grossly disingenuous, as will be seen on comparing his certificate, No. 18, with the following:

No. 11.

This may certify that the paragraph that Mr. James Rumsey has copied from my letter, which he applies to the injury of Mr. John Fitch's character, was *not told to me by Mr. Fitch*, but by other persons, who, for reasons, were convinced of his priority of invention. And as to the time of writing the letter, it was *when Mr. Samuel Briggs was making patterns* for Mr. Fitch's castings. As witness my hand this 12th day of May, 1788. DANIEL BUCKLEY.

On my return to Philadelphia I applied to Mr. Briggs in order to ascertain the *time of his making my patterns*, and he freely gave me the following certificate:

No. 12.

This may certify whom it may concern that in the *summer of* 1786, I performed some turning work for John Fitch, being patterns for castings for his steamboat, and before that time I made no work for the said John Fitch; that I am acquainted with Daniel Buckley, and saw him at my shop during that summer, and at sundry times since, and we have frequently conversed about James Rumsey, but the particulars of any conversation with him I do not recollect.

SAMUEL BRIGGS.

Affirmed the 15th May, 1788, that the foregoing is just and true, before

PLUNK'T FLEESON.

Thus, independent of all other proofs, have I brought a conclusive evidence out of Mr. Rumsey's own writings and from his own testimonies, that the steam machinery *sworn* to have been on board *in December*, 1785, could not have been ready until December, 1786. And here I might safely rest my defence, and very properly quote Mr. Rumsey's own words, (annexed to this certificate, No. 18,) viz: "Should he incline to *assert* hereafter, what credit he will deserve has been so clearly proved that *future impositions* may be avoided, and *those* who spread a slander they *do not believe* deserve the contempt of all honest men."

But I will proceed, and must not omit remarking that this third page of his work is very fatal to him. He says, "I should certainly have quitted my steam engines, (*engines only in idea*,) though in great forwardness, and have produced *the boat for which I had obtained the certificate*, &c., had not a Mr. Fitch come out at this critical minute with his steamboat," &c. And further adds, "Had I exhibited my *first boat*, it would have been construed into an acknowledgment of Mr. Fitch's assertion, by producing a boat with which steam had nothing to do. These considerations compelled me to pursue the perfecting my steam engines with increased ardor." Thus I have a proof from himself that the certificates from General Washington, &c., (which procured his laws in Virginia, Maryland and Pennsylvania,) *had no reference to steam*; consequently *my laws* for the exclusive use of steam applied to boats cannot interfere either with *his* laws, or his expectations at the time of asking for them. I applied to the several legislatures openly and unguardedly, without friends and without patrons, and from the pure merit of my pretensions, met with success, without a whisper being breathed that I was interfering with Mr. Rumsey. I am confident that he never conceived me to be a rival in navigating boats until he found his own plan hopeless and mine likely to succeed.

In his third page he says, "I wrote to General Washington 10th March, 1785, that I intended applying both powers to a boat built after the model of the one he saw at Bath; but the disadvantages before mentioned still remained, and, as I could gain truth only by successive experiments, *incredible delays* were produced, and though my distresses were greatly increased thereby," &c. It is truly amazing that—though he had long before this letter been making progress in steam engines, and gaining truth by successive experiments and *incredible delays*, insomuch that, at the time of his proposing to get cylinders cast at Governor Johnson's works, in October, 1785, he had the principal part of his work untouched—I say it is amazing that these *incredible delays* should all vanish as in an instant, and that, between the time of his failing at Governor Johnson's works, in October or November, 1785, and the first of December following, he should have completed his whole machinery, ready to be put on board. A steam engine is a complex piece of work, and his subsequent transactions show that he found it so; for it has taken him from the summer of 1786 (when he removed his works from Fredericktown) to the winter of 1787 to make them ready for a fair experiment. No person, therefore, can be brought to believe that his first machinery could have been conjured together in little more than thirty days. No such thing happened. I have already sufficient proof to the contrary, and have no doubt but a multitude of corroborating witnesses will voluntarily offer themselves when this pamphlet gets down to Fredericktown and Shepherdstown, where I shall take some pains to have it circulated. It

is truth alone I am in search of, in order to wipe off the imputations from my own character; for as to stability of title to my exclusive rights, I shall not cast away an anxious thought about it. I am secured by my laws, and my "*coadjutors*," as Mr. Rumsey is pleased to term them, I am sure, have no sort of apprehension about the moneys they have risked, and only wish that I should remove any aspersions that may be unjustly cast upon me. Thus far, it may be said, they have an interest in my success, because a law in my favor in Maryland is yet depending.

I must not yet quit the subject of Mr. Buckley's letter, in his third page, from whence it is plainly to be gathered that, subsequent to his letter of 10th March, 1785, to General Washington, he meant to tell the world he was busily employed in *private experiments* on steam engines, and that although his first setting pole boat "bore the pelting of ignorance and ill nature," yet he did not set about making a steam engine for this boat until (as he calls it) the *critical moment* when a Mr. Fitch, with his steam engine, came out, asserting that he was the first inventor of steam, and that "I had gotten what small knowledge I had from him." Now as all his experiments were privately conducted, and he does not pretend to have begun his boat engine until Mr. Buckley had sent notice that I charged him with stealing knowledge from me, I would ask any man where I was to obtain the grounds for my charge? It could not be until I had begun my own engine, and made it everywhere public. Then it follows that my pretended complaint against him must have been subsequent to my own works and prior to the beginning of his works for his boat in *November*, (as he calls it) which, from his own statement, has laid a fair and just foundation for my claim of public priority, for private priority is out of the question, as Mr. Henry, Mr. Ellicott, and Mr. Paine are before us both.

Nay, even after the real steam engine for his boat was actually begun, we find it kept as the most profound secret; and from Charles Morrow's deposition it is declared, that the boat came to Shepherdstown early in the fall 1785; that Mr. Barns went to Baltimore shortly after, to have some machinery cast; and on his return from Baltimore was sent to Fredericktown in order to have some other things made (which could not consistently with Governor Johnson's letter, be earlier than the beginning of November) and about the middle of November they were all finished, viz: *a boiler, two cylinders, pumps, pipes, &c.* I confess this is very brisk work for a country town—more than ever I could get in the city of Philadelphia.

At Baltimore four large cocks were bespoke by Mr. Barns, and the brass-founder was told they were for the *Warm Springs of Virginia* as will presently appear: Governor Johnson was entrusted with the scheme in confidence, and the copper works were carried on in Fredricktown with great secresy, insomuch that a citizen hearing it rumored that they were for a steam engine, applied to see them, but was refused, (as will be shown,) and the matter still remained a secret, until as Governor Johnson says, "the designed purpose of the cylinder, was a subject of pretty general conversation in Fredericktown." Then during this interval of privacy, surely any man that should have conceived the same idea, and brought it forward to public view, ought to be entitled to the right and advantages of the discovery—for all these confidential persons, as I have already said, might have died, and the world have lost the benefit. Let me consider the danger of admitting this new doctrine of claims: A man makes a valuable discovery, he pursues it at a great expense and publishes it to the world; a set of men combining together, shall afterwards come forth, swear for each other, that they had been making the same kind of engine, many months before, and bring proofs from respectable characters, that they had hinted at the practicability of such a scheme, even before their private experiments. Will any man of the least particle of understanding allow, that this *private work* shall be admitted to contain sufficient evidence to overset the public works of a fair and open artist? Surely not. If it was once allowed, men would not be wanting to swear away from the real inventor, the most valuable discoveries in the world. All they would desire from the public claimant, would be, for him to fix the earliest date to his discovery, and if it was twenty, or even fifty years back, they would prove that they themselves, their fathers or grand fathers, or some distant friend, had communicated it many years before. There is no end to this kind of proof; and both reason and law unite in defending the *first public* discoverer. It would be dangerous in the highest degree to deviate from this rule. If Mr. Rumsey did really in good faith and conscience intend to carry into execution, the secret he communicated to General Washington, I can only say he was unlucky in delaying it so long, as to let me, with my subsequent discoveries, come forward before him; what I did was public—it was notorious to all Virginia and Maryland, and not a murmur was raised against me, not a syllable uttered (that I ever heard) charging me with interfering with Mr. Rumsey. The Assemblies of Virginia and Maryland encouraged my scheme, and nobody told me I should interfere with him. My petitions laid long before the Assembly of Virginia, and a law was ultimately passed in my favor, without objection or complaint. Mr. Rumsey has insinuated that I got my first thought from Captain Bedinger in Kentucky, who went there in 1784; nay, he goes so far *in one place*, as to say, he "was told so," and in *another* that "circumstances leave little room to doubt it." I have already declared, that I have not been in Kentucky since the year 1781: thus falls to the ground, this part of his "plagiarism" allegations. But I will suggest to him, that it is much more probable that all *his* determinations of beginning his steam engine, might have come to him in a much straighter line, than from Kentucky to me. Captain Bedinger is so uncertain about the matter of his ever having mentioned *steam* in Kentucky, that he only says coldly, that he "*believes*" he also mentioned "that it worked by steam." I will remind Mr. Rumsey, that I not only *believe* that I presented my plan to Congress, *before* the time he pretends to have spoken to Gover-

nor Johnson about getting cylinders for him, and *before* his copper works were bespoke, but the files of Congress will *prove*, that in August, 1785, I laid my plan before them; and nobody will suppose it was a very indirect road from Congress to each of the United States. A very few days after my plan was laid before them, Mr. Rumsey might have been furnished with a copy of it; and if any member of Congress should know of such a transaction (certainly very innocent in itself) he will confer a great obligation on me by communicating it. But in Philadelphia it was public before it went to Congress, and long before Mr. Rumsey's orders went to Fredericktown or Baltimore. I have a fair right to suppose all these things, and Mr. Rumsey's giving me no opposition in my application for exclusive laws, and even permitting his law to expire in Pennsylvania, without trying to derive any benefit from it, amount to positive proof that he had no serious thoughts about applying steam, until it was too late. I promise him, I shall not be so dilatory in exhibiting *my boats* in Virginia, conformably to my law. I trust to the goodness of my cause and the honor and generosity of my country,—and that I not only have a substantial right by exclusive laws, but by justice and equity.

The affidavits from William Askew, No. 6, and Henry Bedinger, No. 7, to prove that Mr. Rumsey's boat is much superior to mine, is acknowledging on the part of Mr. Rumsey, that his pretensions to the invention are but weakly founded. However faulty my works might be, and however perfect his own, it would have no force in the determination of our title to the invention; but argues a wish in him to gain an advantage on principles different from those on which our dispute must be ultimately *decided* in the *opinion* of the world. But even this position of Mr. Rumsey's I will not allow; for on a comparison of the velocity and bulk of both boats, and the force applied, it is evident that mine exceeded in the proportion of more than two to one. I had a bulk of water to remove equal to above twelve tons, whilst he had to contend with no more than three tons, if I am rightly informed; and our cylinders (or moving powers) were nearly, if not quite equal; yet my boat was urged forward with nearly the same velocity of his boat; therefore, his mode hath hitherto no superiority. As to his drawing water in at the bottom, and pushing it out at the stern of a vessel, it is no new invention, but was long before presented to the Philosophical Society at Philadelphia. The thought came originally from France, of which I was acquainted before he bespoke any of his works for steam, and contended the right of using it with Mr. Arthur Donaldson, in the beginning of 1786, before the Assembly of Pennsylvania, as he attempted at that time, to assume the discovery to himself.

No. 13.

I well remember when Mr. Arthur Donaldson proposed before the Committee of Assembly, a method of navigating boats by a stream of water forced through by means of a steam engine, that you appeared to be acquainted with the principle, which was said to be originally Dr. Franklin's, and that you then declared it had been your intention to have made an experiment upon it.

GEO. CLYMER

Mr. John Fitch, May 17, 1788.

In spite of all opposition I was left in full possession of that or any other way I chose, provided I worked by steam, and no man can take it from me until my laws expire. I conceive we have by no means come to the greatest perfection of applying our power. I am now trying an experiment, and the machine is nearly finished, to propel a boat, not by expelling *water*, but *air*, and hope Mr. Rumsey will allow that this is a mode peculiar to myself; but if he pleases, he will deny it, and assert that he had privately tried some experiments to ascertain its practicability. I further hope that the public will make great allowances for my not being more forward in my plans, especially when they consider the great difficulty of procuring proper workmen, together with the new and unexplored ground that I had to travel over, but hope shortly that I shall have it so perfect as to give full satisfaction of its utility.

In page 5, he asserts that my boat will not be propelled at the rate of more than three miles per hour, when no tide opposes; this assertion, I believe, will shortly be proved both rash and envious. I can make her go not only three, but three times three.

But as I have before mentioned, this is taking up the dispute upon different principles than those Mr. Rumsey found necessary to hold up to public view, viz:—that he was the inventor of the steamboat. This leads me to consider the principles on which exclusive privileges are founded, agreeably to justice and policy. If we have recourse to the enlightened nations of Europe, and more especially to England, whose laws respecting the title to property, are (with little, and in some cases, with no variation) in force among us, we shall find that their laws imply that no species of property ought to be held more sacred than the property of inventions; for having their origin in the imagination of man, uncertain in their operations, and expensively perplexing in experiment, it becomes necessary to have some mode established to secure to the owner the full benefit of his invention, which might otherwise prove his ruin. To prevent which, justice and good policy have pointed out a remedy, and custom has established it on a permanent basis. The inventor can claim no benefit from his thoughts or inventions, before he makes a public declaration of such invention in some place of record established for such purposes; that is—he who invented and published a *steam engine* will have an exclusive right for a certain number of years for all steam engines; at the *expiration* of which, each *improver* has an undoubted right to the benefit of any *improvement*. On these principles, he who first invented and published the idea of a steamboat, invests himself with a fair and just title to all steamboats for a certain time, which in justice and policy, government is bound to support. The State of Pennsyl-

vania hath given her sentiments on this head, and hath declared such to have been her explanation of the title to inventions by rejecting Mr. Arthur Donaldson's petition to have me confined to a certain mode of applying my power. It was not the mode of *using the force of steam* which had any merit in this invention, but it was the idea of connecting *steam* with *navigation*, that justly claimed the public patronage, as soon as that idea was made public, and the benefit of it applied for.

I shall now introduce the proofs I have promised, and show to the world what degree of credit and countenance ought to be given to a man who, in order to deprive me of my just rights, has brought forward evidences to swear to facts which are totally false. You will see that transactions are antedated, and a deception intended, with a view both of disgracing and robbing me. Confident that gross misrepresentations had been made use of, I was at the expense and trouble of two journeys to Fredericktown, in Maryland, the scene of his operations, and there I was soon confirmed in my suspicions that this plausible pamphlet was built on falsehood, and that the patrons whom Mr. Rumsey's address has procured him in this city, have committed themselves too unreservedly to a stranger. I now find the reason of his so long delaying to put in his claim—it was that a period might elapse sufficient for memory to be uncertain, and for facts to be transposed in the order of time; the death of one of his principal workmen also rendered it probable that some of his pretended proofs might be difficult to detect. A love of justice has induced a number of persons to step forward and testify in the most unequivocal manner that the works sworn by Mr. Rumsey's evidences to have been finished the 1st December, 1785, were not begun until March following, when he must have been very fully possessed of a knowledge of my pretensions.

The ten following certificates will prove fully the antedating:

No. 14.

The affidavit of Frederick Tombough, Smith and partner of Mr. Zimmers, the copper-smith in Fredericktown, who made the copper work for Mr. Rumsey's steamboat.

MARYLAND, Frederick County, April 18th, 1788

Then appeared before the subscriber, a justice for said state and county, Frederick Tombough, aged about thirty-nine years, who being sworn on the holy Evangelists of Almighty God, deposeth and sayeth, that some time in March, 1786, he, this deponent, was in partnership with Matthias Zimmers now deceased, in a black-smith's shop adjoining said Zimmers' coppersmith shop, and that he remembers two copper pipes being brought into his shop by said Zimmers, to fix the seams—which pipes, he was told, were for Mr. Rumsey's steamboat—and further, that he knew of no work being done in Mr. Zimmers' shop on account of said boat, previous to the time above mentioned. Sworn before

GEORGE SCOTT

No. 15.

The certificate of Mrs. Zimmers, widow of Mr. Zimmers, which is corroborated, and the time established by the next certificate:

This may certify that I, the subscriber, wife to the late Matthias Zimmers, deceased, have no accounts in my books so as to ascertain the time of Mr. Rumsey's bespeaking his machinery for his steamboat, or as to the time of his taking it away—but that Michael Baltzel turned works to finish the first machinery said Rumsey had of my husband, according to the best of my knowledge. As witness my hand, this 29th April, 1788.

ELIZABETH ZIMMERS.

No. 16.

The certificate of Michael Baltzel, Turner, which establishes the time of Mrs. Zimmers' fact.

FREDERICKTOWN, 17th April, 1788.

This may certify that I, the subscriber, turned works for Mr. James Rumsey, of Virginia, for his steamboat, viz., a round piece of wood about 8 inches diameter, and about 4 feet long, &c., to round his copper works upon. Said turning was done in March, 1786. As witness my hand.

MICHAEL BALTZEL.

No. 17.

The certificate of Mr. Jonathan Morris, innkeeper, which confirms the assertion in Governor Johnson's letter, that the "designed purpose of the cylinders, was a subject of pretty general conversation" in Fredericktown, and therefore, had it been prior to my petition to the Assembly of Maryland, the middle of December, 1785, Mr. Foy, the member of assembly resident in that town, must have known it, and the house have received information from him, when probably they might have assigned other reasons for rejecting my petition than mere bareness of finances. If all the machinery was ready to put on board, as Mr. Morrow swears, on the 1st December, it must have been a fact notorious to the whole town; but the following declaration shows that so far from being on board in December, 1785, it was shut up as a secret even so late as the latter end of March following; so that this "pretty general conversation," which Governor Johnson

speaks of, could not have happened until about this time, and all the evidences I produce confirm my assertion, that Mr. Rumsey did not begin his steam engine, until I had published my plan all through Maryland and Virginia. The certificate is as follows:

FREDERICKTOWN, 18th April, 1788.

This may certify, that I the subscriber, was towards the latter end of March, 1786, informed that Mr. Matthias Zimmers had begun some machinery for Mr. Rumsey's steamboat. Accordingly I called on Mr. Zimmers to see it, but was refused the sight of it, as it was then retained as Mr. Rumsey's secret; but was informed that it was begun in the beginning of the same month, this I declare to be the truth as near as I can recollect.—As witness my hand,

JONATHAN MORRIS.

No. 18.

The deposition of John Peters, who performed such parts of Mr. Rumsey's machinery as were made of tin

FREDERICK COUNTY, Maryland, April 18th, 1788.

I the subscriber was a journeyman and worked for Mr. Matthias Zimmers, and began to work in the tin business, at the same time Mr. Zimmers did begin the copper works for Mr. James Rumsey, of Virginia, for his steamboat, which said coppers and tin works were begun in March, in the year 1786. JOHN PETERS.

Sworn before me, Jacob Young, one of the justices for Frederick County, Maryland.

No. 19.

The deposition of John Frymiller, who was apprentice to Mr. Zimmers at the time he made the copper works for the steam engine, shewing not only that the works were begun and finished in a shop next to Mr. Tombough, but that no part of the said machinery was begun *before* the spring, 1786.

State of Maryland, Baltimore County.

On this twenty-sixth day of April, in the year of our Lord one thousand seven hundred and eighty-eight, before me the subscriber, one of the justices of the peace for the county aforesaid, personally appeared John Frymiller of Baltimore town, in said county, and made oath on the holy Evangelist of Almighty God, that during the time he was an apprentice to the late Mr. Matthias Zimmers of Fredericktown, in Frederick county and state aforesaid, deceased: when he the said Matthias Zimmers, made Mr. James Rumsey's machinery for the steamboat; that he, this deponent, did work at the said James Rumsey's machinery. That it was begun in the spring of the year 1786, and that no part of said machinery was begun before the time above mentioned, by the said Zimmers, to the best of his knowledge—and further that the said machinery was begun and finished in a shop adjoining Frederick Tombough's smith shop, (which said Tombough was as the deponent has been informed, in partnership in the smith's business at said time, with said Zimmers) in which said Matthias Zimmers had his coppersmith's fires for brazing, &c., and further this deponent saith not. Sworn before me,

JOHN MOALE.

The following certificate proves that Mr. Rumsey's machinery was made by Mr. Zimmers, in Fredericktown, in the spring of 1786, there being but two coppersmiths in Fredericktown, viz: Messrs. Matthias Zimmers and Joshua Minshall, the certifier.

No. 20.

This may certify that I the subscriber, coppersmith, have resided in this town about three years, during which time there have no coppersmiths resided in the town, except Mr. Matthias Zimmers and myself, and that I was knowing to Mr. Zimmers making copper works for Mr. Rumsey's steamboat, and am of opinion it was late in the spring or summer, before said Rumsey took said works from Mr. Zimmers in the year 1786. As witness my hand, 29th April, 1788, at Fredericktown, Maryland. JOSHUA MINSHALL.

The foregoing testimonies, I presume, will carry full conviction that Mr. Rumsey has shifted his dates, and has got two of his workmen to swear to it. For Messrs. Barns and Morrow, if they had consulted their accounts, must have found that they had made a lapse of a whole year at least, and that the December, 1785, which they speak of must have been December, 1786. The circumstance of being stopped by the ice proves it to have been in the winter, and therefore must inevitably have been in the winter of 1786. But this was too late a date to serve their purpose of supplanting my claims and just rights, which I mean to maintain under the laws I have already obtained, and have no doubt of succeeding in my applications to the other assemblies, when they come to see my proofs, and Mr. Rumsey's false datings. He has mentioned *the* obtaining part of his works from Baltimore, where I can also show he has used the same want of candor, and it will confirm the proofs from Fredericktown.

It appears the four large cocks for his steam pipes and works, were bespoke of Christopher Raborg, in Baltimore, by Mr. Barns, who, the better to conceal the "designed purpose of the cylinders," told him they were for the Warm Springs in Virginia. Perhaps a little mental reservation might cover this deviation from fact. But Mr. Raborg had no account thereof and could not give the time with precision, though he believes they were made in the fall of 1785. The certificates, No. 20 and 21, which follow, prove that the time was certainly in the spring, 1786. As these certificates appear to refer only to cocks made for the Warm Springs, I had considerable doubts about admitting them into my defence; because Mr. Rumsey on finding that I proved them to be made in March, 1786, might (if he pleased) adhere to Mr. Barns's declaration of their being made for the Warm Springs and not for the steamboat. But I am now happy in having a confirmation under Mr. Rumsey's own hand, published in Mr. Oswald's paper of the tenth instant, where he informs the public, "Mr. Raborg was the person who undertook to make cocks for my steamboat, and by him I shall prove that they were finished at the time he mentioned to Mr. Fitch, viz: the fall of 1785."

Christopher Raborg's certificate is as follows:

No. 21.

This may certify, that Mr. Joseph Barns did bespeak of me four brass cocks, which he said were for the warm springs—that being disappointed by my journeymen, I got them made by Mr. Charles Weir & Co. Said cocks I do believe were made in the fall 1785, but have no charge made of them to ascertain the time with precision. This I assert, as witness my hand, at Baltimore, this 26th day of April, 1788.

CHRISTOPHER RABORG.

No. 22.

The certificate of Charles Weir, who speaks with tolerable certainty of the works being made in the spring of 1786.

This may certify that when I was in partnership with Isaac Causten I made four brass cocks for Mr. Christopher Raborg, for which I received the money, and charged myself with it—that my books are destroyed, and I cannot exactly recollect the time of their being made, but am persuaded it was early in the spring of the year 1786. This further may certify that I never made the exact number of four cocks for said Raborg, except only that one time. As witness my hand, at Baltimore, 26th day April, 1788.

CHARLES WEIR.

No. 23.

The certificate of Isaac Causten, who ascertains upon good grounds that the said work was done and charged on the 29th March, 1786.

This may certify, that I, the subscriber, with my partner, Charles Weir, made four brass cocks for Mr. Christopher Raborg, and charged them in the partnership account. Said book has since been destroyed, but from some loose papers I found charged to Mr. Raborg on the company's account, on the 29th March, 1786, four brass cocks, which, with other accounts, I have drawn out into my day book. Neither have I made the exact number of four cocks for him at any other time. In witness whereof I have hereunto set my hand this 26th day of April, 1788.

ISAAC CAUSTEN.

The reader will, doubtless, on an examination of the two pamphlets, perceive things in their true light, and that Mr. Rumsey made no pretence to use steam till after the failure of his boat on the principles exhibited at Bath, after I had invested myself with an undoubted title, by exhibiting the invention to Congress in August, 1785, and had published it to the States of Virginia and Maryland, who became virtually bound to secure me the right. Mr. Rumsey prosecuting his works in secret, and appearing at this late day with antedated facts, is a full proof that he had no claim to the invention—nor is there any one principle of law or equity on which he can found his pretensions. If he claims it on his *thought*, Mr. Paine, Mr. Henry, and Mr. Andrew Ellicott are long before him: if on forming drafts without communicating them to the public, he must acknowledge Mr. Henry's priority: but if it is to be decided, as it certainly must, by the established mode of public declaration on record, my title is indisputable. Being, therefore, certain of the stability of my claim, founded on the modes established in justice and policy, I have not a doubt but my country will secure and protect the right she has so deliberately granted to me. Under this security I embarked my time, my fortune and reputation; and, thus embarked, I am certain I have nothing to fear—but shall depend with full confidence on a continuance of that justice which is due to the rights of the citizen and the honor of my country.

JOHN FITCH.

PHILADELPHIA, 10th May, 1788.

POSTSCRIPT.

Since this Pamphlet went to press a second edition of Mr. Rumsey's pamphlet has been printed in this city, in which a short advertisement is prefixed, and an extract of his own letter to General Washington, which are as follows:

ADVERTISEMENT.

The following pages are taken from a pamphlet published in Virginia, to prove the author's prior right of applying steam to propel boats, &c., as well as to establish the principles on which he has done it. A few copies were then thought sufficient for that purpose, but as Mr. Fitch intends to answer the pamphlet, it is therefore necessary to re-publish as much of it as respects Mr. Fitch, which is done with no other variation from the original than to correct a few of the omissions and mistakes that were introduced into the first publication, from the hurry in which it was done, (as the author at that time could not attend the press,) and was circulated with an apology annexed to the postscript, for the imperfection of the impression. Of these corrections perhaps Mr. Fitch may take some notice; if he should, such part of the old pamphlet shall be re-printed, (verbatim,) to convince the public that the subject has not been varied, but a little better explained. The sophistry in Mr. Fitch's reply (should it contain what he informs me it does) is evidently calculated to make impressions unfavorable of me on the public mind, and to wound the reputation of several respectable characters. I must therefore beg the public's indulgence to suspend their opinion for a few weeks, when I shall have it in my power to lay before them such additional statement of facts, supported by such respectable testimony, as will incontestibly prove the unjustifiable steps Mr. Fitch has taken to deprive the author of his discoveries, and to injure the reputation of sundry gentlemen.

No. 19 is added to this publication—it is part of a letter wrote by the editor to his excellency General Washington, dated the 10th of March, 1785, which will show that the editor had fixed on a method of applying steam to propel a boat before Mr. Fitch knew (from his own account of the matter,) that steam had ever been made use of for any purpose whatever. How, then, is it possible he should have the prior right to this discovery? If it is asked who made the most promising experiment, it would be found that my experiments, two years since, exceed the best he has ever made. Must I then be deprived of my discoveries, which are substantial, because I endeavored to keep them secret until perfected? Justice will never suffer it. I therefore with the greatest confidence, look up to my countrymen for their support, according to the merits of my cause—and have the honor of subscribing myself their most devoted humble servant,

JAMES RUMSEY.

Philadelphia, May 7th, 1788.

As to his advertisement, I have fully proved that he made no experiment on his boat with steam two years ago, his machinery being at that time in Fredericktown. And his boat so far exceeding mine will also appear a wrong assertion, as the greatest distance he pretends to have propelled his small boat per hour is four miles, and that appears to be mere ideal estimation. In my boat, by the same force applied, I let out three miles and a quarter per hour by the log line. This is departing from the merits of the dispute—but to convince the public of his assertion on this head being absurd, I shall introduce certificates No. 24, 25, 26. As to his request of suspending the public opinion, I rest my cause on solid and fair conclusions drawn from his pamphlet, a very safe and candid judgment may be formed of the merits of Mr. Rumsey's pretensions, it being evident that all his false assertions and false dating will never prove that two and two are not four.

No. 24.

These may certify that the subscriber has frequently seen Mr. Fitch's steamboat, which with great labor and perseverance he has at length completed, and has likewise been on board when the boat was worked against both wind and tide, with a very considerable degree of velocity, by the force of steam only. Mr. Fitch's merit in constructing a good steam engine, and applying it to so useful a purpose, will no doubt meet with the encouragement he so justly deserves from the generosity of his countrymen, especially those who wish to promote every improvement of the useful arts in America.

DAVID RITTENHOUSE.

Philadelphia, December 12th, 1787.

No. 25.

Having also seen the boat urged by the force of steam, and having been on board of it when in motion, I concur in the above opinion of Mr. Fitch's merits.

JOHN EWING.

No. 26.

From the well known force of steam, I was one of the first of those who encouraged Mr. Fitch to reduce his theory of a steamboat to practice, in which he has succeeded far beyond my expectations. I am now fully of opinion that steamboats may be made to answer valuable purposes in facilitating the internal navigation of the United States, and that Mr. Fitch has great merit in applying a steam engine to so valuable a purpose, and entitled to every encouragement from his country and countrymen.

ANDREW ELLICOTT.

PHILADELPHIA, December 13th, 1787.

Copy of Mr. Rumsey's extract, No. 19.

The following is part of a letter wrote by the editor, to his Excellency, General Washington, dated the 10th of March, 1785.

After mentioning that kind of machine for propelling boats, which the General had seen a model of, I proceed to say—"I have taken the greatest pains to perfect another kind of boat, *upon the principles I mentioned to you at Richmond*, in November last, and have the pleasure to inform you that I have brought it to great perfection; it is true, it will cost something more than the other way, but, when in use, will be more manageable, and can be worked with as few hands; the power is immense—and I have quite convinced myself that boats of passage may be made to go against the current of the *Mississippi* or *Ohio* rivers, or in the *Gulf Stream* (from the *Leeward* to the *Windward Islands*) from sixty to one hundred miles per day. I know this will appear strange and improbable to many persons, yet I am very certain it may be performed, besides, it is simple (when understood) and is also strictly philosophical.

The principles of this boat I am very cautious not to explain, as it would be easily executed by an ingenious person.

The plan I mean to pursue, is to put both the machines on board of boats* built on a large scale, and then, sir, if you would be kind enough to see them make actual performances, I should not doubt but the assemblies would allow me something handsome, which would be more advantageous to the public than to give me the exclusive right of using them."

As to the extract of his letter to General Washington of the 10th of March, 1785, it is nothing more than a declaration that he intended something; that even if it was steam he meant to make use of, it was a profound secret which he was then cautious not to explain. But let us take a view of this letter, and I have no doubt but from the very wording of it, it will very clearly appear that the utility of steam (if that was what he meant to convey) was with him at that time very doubtful, and upon which he could have no kind of dependence; and holding up the idea of secrecy so punctually, least some artist, more ingenious than himself, should complete a steamboat before him, shows indubitably that he conceived it as an agent at a great distance from him, and upon which he had no reliance, or from which the public could then expect no advantage, and indeed I am confident that his ideas of a steam engine (if any he had, which I much doubt) were very inferior to Messrs. Henry's, Ellicott's, Paine's, &c., in the year 1778, but as no publication to the world took place by them, they are candid enough not to claim it as an invention of theirs. But should I even go so far as to admit he had thoughts of applying steam, and that he intended exhibiting a steamboat to General Washington, it was nothing more than an intention he held in secret, on the 10th of March, 1785, and even by his declarations to Governor Johnson, if they were as early as October or November, 1785, he kept it then a secret—nothing was imparted to the public, therefore nothing due from them. I had long before declared my intentions through Congress, and thereby invested myself with the indisputable title to my invention throughout the United States. Maryland and Virginia had virtually pledged the honor of their states to secure me in this right. Virginia has since supported that honor, by cheerfully passing a law for that purpose, and Maryland, I doubt not, as also other of the United States, will pay equal regard to justice and policy.

N. B. As the application of steam to vessels will undoubtedly claim the early attention of the world, as the least expensive and safest mode of navigation, I doubt not but the impartial public will yet, with pleasure, secure in me those rights, for which security, had I applied on the first exhibition of my scheme, would have been granted without murmur or delay; but as a confidence in the honor of my country, and a want of finance, were then the preventatives, the delay certainly will not operate now against me, as the utility of the invention more clearly appears, and thereby the attention of my country more reasonably claimed.

The following certificates were omitted in their proper places.

No. 1.

I do certify, that as I was returning with John Fitch from Neshamany meeting some time in April, 1785, as near as I can recollect the time, when a gentleman and his wife passed by us in a riding chair; he immediately grew inattentive to what I said. Some time after he informed me that at that instant the first idea of a steamboat struck his mind.

JAMES OGILBEE.

* There were two boats connected, in the model I exhibited at Bath, in September, 1785, which is the reason I speak of boats in the plural, as experiment had convinced me that a single boat would not succeed on that principle.

No. 2.

An extract of a letter from James Scout.

You are desirous of knowing from me when the first thought of a steamboat came in your head; this I cannot tell, but this you told me; that in the month of April, 1785, you were travelling down Street road, in company with Mr. James Ogilbee, and Mr. Sinton passing you on Street road, that then the first thought occurred to you of a steamboat, and the month of May or June following, you showed me a plan of your machine on paper; this truth I shall seek no further testimony to support; 'tis too generally known; let them that doubt it come and hear more from Your humble servant,

JAMES SCOUT.

April 15th, 1788.

No. 5.

This is to certify, that Mr. John Fitch called upon William Henry, Esquire, my late husband in his life time, about two years and an half since, when Mr. Fitch showed to him drafts and a model of a machine how to propel a boat through the water. And further, that I have frequently heard Mr. Henry applying steam as a means to urge boats through the water by force of it, and that he had proposed laying a model of a machine for that purpose, before the Philosophical Society, long before Mr. Fitch called upon him.

Witness my hand, this 12th day of May, 1788.

ANN HENRY.

Test,—Jno. Jos. Henry.

FINIS

JACOB PERKINS.

THIS eminent inventor died during the past year. The following tribute to his memory is entitled to a place here, inasmuch as Mr. P. took out seventeen American patents—the first one in 1799, for nail making machinery.

"A simple and unostentatious notice of the demise of this remarkable man, is all the tribute that the public press has yet paid to his memory. The merits of our ingenious countryman deserves more. He has passed quietly away from the scene of his labors; but he has left his mark upon the age.

He was descended from one of the oldest families of that ancient portion of the State of Massachusetts, the county of Essex—a region of stubborn soil, but rich in its production of *men*. Matthew Perkins, his father, was a native of Ipswich, and his ancestor was one of the first settlers of that town. Matthew Perkins removed to Newburyport early in life, and here Jacob Perkins was born, July 9th, 1766. He received such education as the common schools of that day furnished, and nothing more. What they were in 1770 may be guessed. At the age of twelve he was put apprentice to a goldsmith of Newburyport, of the name of Davis. His master died three years afterwards; and Perkins at fifteen, was left with the management of the business. This was the age of gold beads, which our grandmothers still hold in fond remembrance—and who wonders? The young goldsmith gained great reputation for the skill and honesty with which he transformed the old Portuguese *joes*, then in circulation, into these showy ornaments for the female bosom. Shoe-buckles were another article in great vogue; and Perkins, whose inventive powers had begun to expand during his apprenticeship, turned his attention to the manufacturing of them. He discovered a new method of plating, by which he could undersell the imported buckles. This was a profitable branch of business, till the revolutions of fashion drove shoe-buckles out of the market. Nothing could be done with strings, and Perkins put his head-work upon other matters.

Machinery of all sorts was then in a very rude state, and a clever artisan was scarcely to be found. It was regarded as a great achievement to effect a rude copy of some imported machine. Under the old confederation, the State of Massachusetts established a mint for striking copper coin; but it was not so easy to find a mechanic equal to the task of making a die. Perkins was but twenty-one years of age when he was employed by the government for this purpose; and the old Massachusetts cents, stamped with the Indian and the eagle, now to be seen only in collections of curiosities, are the work of his skill. He next displayed his ingenuity in nail machinery, and at the age of twenty-four invented a machine which cut and headed nails at one operation. This was first put in operation at Newburyport, and afterwards at Amesbury, on the Merrimac, where the manufacture of nails has been carried on for more than half a century.

Perkins would have realized a great fortune from this invention, had his knowledge of the world and the tricks of trade been in any way equal to his mechanical skill. Others, however, made a great gain from his loss; and he turned his attention to various other branches of the mechanic arts, in several

of which he made essential improvements, as fire engines, hydraulic machines, &c. One of the most important of his inventions was in the engraving of bank bills. Forty years ago counterfeiting was carried on with an audacity and a success which would seem incredible at the present time. The ease with which the clumsy engravings of the bank bills of the day were imitated, was a temptation to every knave who could scratch copper; and counterfeits flooded the country, to the serious detriment of trade. Perkins invented the stereotype check-plate, which no art of counterfeiting could match; and a security was thus given to bank paper which it had never before known.

There was hardly any mechanical science in which Perkins did not exercise his inquiring and inventive spirit. The town of Newburyport enjoyed the benefit of his skill in every way in which he could contribute to the public welfare or amusement. During the war of 1812 his ingenuity was employed in constructing machinery for boring out old honeycombed cannon, and in perfecting the science of gunnery. He was a skilful pyrotechnist, and the Newburyport fireworks of that day were thought to be unrivalled in the United States. The boys, we remember, looked up to him as a second Faust or Cornelius Agrippa; and the writer of this article has not forgotten the delight and amazement with which he learned from Jacob Perkins the mystery of compounding serpents and rockets.

About this time a person named Redheffer made pretensions to a discovery of the perpetual motion. He was traversing the United States with a machine exhibiting his discovery. Certain weights moved the wheels, and when they had run down, certain other weights restored the first. The experiment seemed perfect, for the machine continued to move without cessation; and Redheffer was trumpeted to the world as the man who had solved the great problem. Perkins gave the machine an examination, and his knowledge of the powers of mechanism enabled him to perceive at once that the visible appliances were inadequate to the results. He saw that a hidden power existed somewhere, and his skilful calculations detected the corner of the machine from which it proceeded. "Pass a saw through that post," said he, "and your perpetual motion will stop." The imposter refused to put his machine to such a test: and for a sufficient reason. It was afterwards discovered that a cord passed through this post into the cellar, where an individual was stationed to restore the weights at every revolution.

The studies, labors, and ingenuity of Perkins were employed on so great a variety of subjects, that the task of specifying and describing them must be left to one fully acquainted with the history of the mechanic arts in the United States. He discovered a method of softening and hardening steel at pleasure, by which the process of engraving on that metal was facilitated in a most essential degree. He instituted a series of experiments by which he demonstrated the compressibility of water, a problem which for centuries had baffled the ingenuity of natural philosophers. In connexion with this discovery, Perkins also invented the bathometer, an instrument for measuring the depth of the sea by the pressure of the water; and the pleometer, to measure a ship's rate of sailing.

Perkins continued to reside in his birth place till 1816, when he removed from Newburyport to Boston, and subsequently to Philadelphia. His attention was now occupied by steam machinery, which was beginning to acquire importance in the United States. His researches led to the invention of a new method of generating steam, by suddenly letting a small quantity of water *into* a heated vessel.

After a short residence in Philadelphia, he removed to London, where his experiments with high pressure steam, and other exhibitions which he gave of his inventive powers, at once brought him into general notice. His uncommon mechanical genius was highly appreciated; and his steam-gun was for some time the wonder of the British metropolis. This gun he invented in the United States, and took out a patent for it in 1810. It attracted the notice of the British government in 1823, and Perkins made experiments with it before the Duke of Wellington and a numerous party of officers. At a distance of thirty-five yards he shattered iron targets to pieces, and sent his balls through eleven planks, one inch thick each, and placed an inch apart from one another. This gun was a very ingenious piece of workmanship, and could discharge about one thousand balls per minute.

Perkins continued in London during the remainder of his life. He never became rich. He lacked one quality to secure success in the world—financial thrift. Everybody but himself profited by his inventions. He was, in fact, too much in love with the excitement of the chase to look very strongly at the pecuniary value of the game.

He died in London, July 30th, 1849. The name he leaves behind him is that of the *American inventor*. It is one which he deserves, and which is his true glory. He was entirely self-educated in science, and the great powers of his mind expanded by their innate force. For half a century from the hour of his birth he lived in the town of Newburyport. Here he grew up, acquired his knowledge, applied his genius to action, perfected his inventive powers, and gained all his early reputation. At the present day, when books are in the hands of every man, woman, and child, and the rudiments of scientific knowledge are presented to us in thousands of students' manuals, cyclopædias, periodicals, public lectures, &c., we can form no adequate notion of the obstacles which lay in the way of a young man beginning his scientific pursuits at the time when Perkins was a youth. Imagine the state of popular science in 1787, and some faint notion may be obtained of the difficulties which the young artist was compelled to encounter in the preliminary steps of every undertaking. The exact sciences were but slightly regarded, even by those who made pretensions to complete learning in those days; and a great proficient in the mechanic arts could only hope to be considered in the light of a clever carpenter or blacksmith. Men did not dream of such fame as that of Watt and Arkwright. It is much to the honor of his townsmen that Perkins was from his earliest days, held in the highest esteem by them. They fully appreciated his genius, and were proud to honor him. In the latter years of his life, when far removed from the land of his birth, his thoughts and feelings always turned homeward, and he never ceased to express the hope of returning to lay his bones in his native soil. His wish has not been gratified, but his memory will remain for ever connected with the spot."

PAPERS AND ABSTRACTS

RELATING TO

EARLY AMERICAN INVENTIONS.

FROM THE ARCHIVES OF THE STATES.

With the hope of collecting interesting matter relating to early American inventions from sources but little explored, and thereby adding to the value of this section of the annual reports, copies of the annexed circular (marked A) were addressed to the Governors of the several States and Territories of the Union; and of the one (marked B) to the United States Senators and Representatives.

[A.]

U. S. PATENT OFFICE, November 8th, 1849.

SIR,—Endeavoring to trace up the history of American inventions as a duty appertaining to this Bureau, and supposing that interesting facts may lie hidden in the archives of the various States, particularly in the records of patents, of which some are known to have been granted under Colonial rule, and others by more or less of the States, previous to their conceding the right to the General Government; I respectfully request to be furnished with copies of any such documents as may be on file in the State Department of your State—the expense of which will be cheerfully borne by this Office.

It is well known that the application of machinery to many branches of art was begun, and has been brought to its present degree of perfection, almost solely by the ingenuity and labors of our countrymen. I need hardly instance the working of lumber, improvements in ploughs, the cut nail, and card making mechanism; yet definite information respecting these and other inventions, while in their infancy, is entirely wanting.

It is necessary that this Office should possess information on these points, the law clearly requiring, though not in express terms, that descriptions of all known inventions should be within reach, that patents may not be granted for things previously secured. Irrespective of the light they will reflect on the origin of inventions to which they relate, and early struggles of inventors, an increasing interest will be attached to them as matters of enlightened curiosity.

Information respecting the forms of patents, length of time for which they were granted, fees paid, &c., will be highly acceptable; as also any thing relating to the early progress of the arts in your State.

In case no official documents of the kind are on file, may I beg the favor of your referring the subject to any literary or scientific society, or to private individuals who may be in possession of the information sought.

With sentiments of high regard,

I have the honor to be your obedient servant,

THOMAS EWBANK, *Commissioner.*

To his Excellency ———, *Governor of* ———.

(NOTE.—It is not known that patents were issued for inventions in Louisiana by the French, or in Florida, Texas and New Mexico by the Spaniards; but if any were granted, copies of them would be of unusual interest.)

[B.]

U. S. PATENT OFFICE, November 12th, 1849.

SIR,—A copy of the accompanying circular has been addressed to each of the Governors of the States and Territories of the Union, and I respectfully solicit your co-operation in furthering the objects sought to be accomplished. Whatever assistance or advice your more important engagements may permit you to give will be highly appreciated.

There are, it is believed, among your constituents, descendants of old inventors and patentees, who, having documents of the kind referred to in their possession, would be glad to have them filed in this office, and noticed in its reports, as an act of justice to the ingenuity and memories of their ancestors. I have the honor to be,

With sentiments of high regard,

Your obedient servant,

THOMAS EWBANK.

The subjoined highly interesting replies afford abundant proof that much valuable information now lying hid in the archives of the various States may in this manner be collected—furnishing a new stock of materials of great usefulness for future reports of this Bureau.

CONNECTICUT.

OFFICE OF SECRETARY OF STATE,
Hartford, Conn., Nov. 12, 1849.

SIR,—I am directed by his excellency Governor Trumbull to acknowledge the receipt of your communication of the 8th instant, and in reply thereto to transmit such information relative to its subject matter of inquiry as the files and records of this Department may afford.

No separate record of patents or exclusive rights, as such, was made under our colonial government, although such rights were not unfrequently granted by the legislature for a limited term of years, by the passage of special acts or resolutions. The petitions upon which these acts were based are in most cases preserved on file, but rarely contain more than a general averment of discovery or improvement, and in no case are accompanied by specifications likely to prove serviceable to your department. Such petitions were usually referred to a committee, who, after an examination into the facts, reported in general terms favorably or adversely to the prayer of the petitioners. Between the years 1708 and 1789, many acts were in this way passed, granting exclusive rights for terms of from three to fifteen years, as the comparative importance of the discovery claimed, or the branch of manufactures proposed to be introduced, merited in the opinion of the committee.

I subjoin the action of the Legislature on a single petition, and one of the earliest on file, whence you may determine how far such record may be of service, and whether it be advisable to prepare and furnish to your department full copies or abstracts of all similar applications and grants.

In May, 1728, Samuel Higley, of Simsbury, and Joseph Dewey, of Hebron, petitioned for the exclusive right "of practising the business or trade of *steel* making" for twenty years, alleging that the first named petitioner had "with great pains and cost, found out and obtained a curious art by which to convert, change or transmute common iron into good steel, sufficient for any use, and was the very first that ever performed such an operation in America." This petition was accompanied by a certificate of several smiths who had furnished the petitioner with pieces of iron, which a few days afterwards were returned by him "converted into good steel; which was the first steel that ever was made in this country, that ever we saw or heard of, since which he hath made further experiments, taking from us iron and returning it in good steel." The Legislature thereupon granted an exclusive right for ten years,—"provided the petitioners improved the art to any good and reasonable perfection," within two years from the date of the act.

It is not unlikely that in the collections of the Connt. Historical Society may be found more full specifications of many early discoveries made by citizens of our State, than are preserved in this department, and at the next meeting of that Association, your communication will be laid before them, that an examination may be made with reference thereto.

I am sir, very respectfully your obedient servant,

J. H. TRUMBULL, *Clerk.*
For ROGER H. MILLS, *Sec'y of State.*

Hon. THOMAS EWBANK, Comm'r of Patents.

(To this communication the following reply was forwarded.)

U. S. PATENT OFFICE, 16 Nov., 1849.

SIR:—I beg to acknowledge the receipt of your interesting letter of Nov. 12th, and to thank you for the prompt attention paid to the circular from this Bureau, to which your letter refers. The information communicated by you is of an important character, and I have thought it advisable to request that you will have full copies made of all applications and grants similar to that you subjoin, which may be on file in the records of your department. They cannot fail to be highly interesting and useful.

Assuring you that I shall be most happy to reciprocate your kindness in this matter,

I remain very respectfully your obedient servant,

THOMAS EWBANK.

Hon. ROGER H. MILLS, *Sec'y of State Conn.*

NEW YORK.

SECRETARY'S OFFICE, Albany, 26th Nov. 1849.

DEAR SIR:—Your circulars dated 8th and 12th inst., requesting copies of any records in this department of early patents for inventions issued by this State, have been duly received.

It will, I beg you to be assured, afford me the highest gratification to be aiding in any way to the success of your enquiries, and whatever we possess here of a nature to interest you, will be most readily forwarded.

In the second volume of the documentary history of this State, now in press, and which is printed by order of the Legislature, will appear a series of papers and illustrations relating to the opposing claims of James Rumsey and John Fitch, to the credit of having first applied steam as a motive power to boats, &c.

These papers consist in part of James Rumsey's pamphlet and Mr. Fitch's reply, also in pamphlet form. Though these pamphlets are already in print, we republish them, as they form a part of the evidence laid before the N. Y. Legislature in 1788-9 on these and other such claims, and more especially as they are connected with a number of other papers, such as certificates, reports, letters and petitions which have never been published heretofore, as far as I am informed.

I send you in advance, copies of all these documents, and to enable you the more readily to distinguish the printed from the manuscript evidence laid before the Legislature, I annex hereunto a list of the latter class of exhibits.

I am unable at present to say if there be any papers of the description you desire, among our colonial records. These are now in progress of arrangement, preparatory to being bound and catalogued, and if any be found I shall have copies forwarded. The petition of one Mash, an old inventor in 1692, to Gov. Fletcher for aid for an "engine" which you will find herewith, is sent rather as a curiosity for its style, than as possessing any other particular merit. With great regard dear sir,

Yours most truly,

CHRISTOPHER MORGAN, *Sec'y of State.*

THOMAS EWBANK, Esq., *Comm'r Patents*, Washington, D. C.

From Manuscript Documents in the Secretary of State's Office, Albany.

Copy of an application to the Governor of New York, in 1693, *for aid to perfect an invention to increase the speed of vessels.*

These are to accquaint the Gouernor yt I am about makeing A small vessell that shall saile faster than all others by Aboundance.

According as I have allreadye acquainted you with all—Now In as mouch as This Exsolent art that I have found out will bee mightily for the Honour and profite of the King and Kingdome of England, and Likewise it will be A meaines to Aduance New York.

Therefore my Requist is, To the Gouernor That he would bee plased In the king's behalfe to let me have as much saill cloth as will make me saills and a Little small riggaine, all which will not coste Aboue seuen pounds.

Now the Chifest reason why I make this Littell Vessell is to make ye Gouernor sencable That I can doe by my art as I have formarly said, And then if the Gouernor will be pleased to acquaint the king therwith, It may doe well.

I pray you Gouernor do not slight This my art, Least it prove to the kings disaduantaige; and Hender yor selfe of benifit that may bee got thereby; for ther hath been many arts Heretofore found out, That was slighted and thought as Imposable As this cane bee, before thay was discoured; as for instancs, at first, who could A beliued that ye wide otione should be crost by art of shiping as it is at this time, and likewise who could beliue That such Grat things should bee done by art of Gunpowder as is, and was not ye man of famus memory, C. C. which dicoured This Amiricay slighted by England, but Imbraced by spaine and portaingall to ther great Honor and profite, and many others Grat discoueryes of Arts That might bee instanced that made Europe to flowrish Aboue other parts of ye world that haue not had the aduantage of such Ingenus men Amoungst them; I pray denie me not of saills, and if I doe not perform what I proposed, Then I will be bound to pay you double for yor damage and yor sails Againe.

JOHN MASH.

JUNE ye 6 day, 1693.

If you please to lett me haue answer by this bearer.

[Addressed]—To The Gouernor of N. Yorck. These

[Endorsed,]—John Mash and his Engine, 7£.

[A true copy of the original in the Secretary of State's Office, Albany, N. Y. E. B. O'CALLAGHAN.]

[From N. Y. Council Minutes, Vol. 8, 11th Feb'y, 1700.]

John Marsh having preferred a petition to this board, praying the Liberty to erect a Mill to go with the Tyde, of such a nature as hath not as yett been used, and desired that for his encouragement he may have a patent for the doing thereof, and for the prohibiting all persons to do the same for a term of years; his Excellency and Councill, on consideration thereof, do promise him Incouragement in the premises, so farr as they can reasonably do the same, and his Excellency doth promise to use his Interest with the Assembly, in their next session, for the procuring an Act for the Incouragement thereof, provided he pay a reasonable quitt-rent to his Majesty, and do perform the same in twelve months.

[NOTE.—The above Marsh was a Carpenter. He is the same that submitted an application to Fletcher, relative to some engine he had invented.]

EARLY STEAM.

The Rumseian Society, Philadelphia, to the Speaker of the House of Assembly, N. Y.

[N. Y. Assembly Papers, Miscellaneous Vol. 3.]

September 23d, 1788.

James Rumsey an ingenious gentleman, a native of Maryland, but lately from Virginia in December last, exhibited before a number of respectable characters in Maryland and Virginia, the effects of steam in propelling a boat of considerable burthen against the current of the river Potomac, and models of machines for the raising water to a great height, and in large quantities by the force of steam, in both which a boiler upon entirely new construction in-

vented by himself, is used with the greatest apparent probability of far exceeding all others heretofore known, not only in point of force but in the smallness of the quantity of fuel necessary to generate the steam.

He came to this city some months ago with drafts and descriptions of his several inventions, and communicated them to a number of gentlemen here, who struck with the simplicity of his several contrivances, and the great advantages with which they might be applied to many useful purposes, agreed to afford him some assistance in carrying his schemes into execution. To this end the persons, a list of whose names is herewith sent, formed themselves into a company, by the name of the *Rumseian Society*, and appointed us a committee of correspondence to further the design in distant places.

As steam engines are now used in Europe not only for the purpose of raising water from mines of great depth, but for a variety of other mechanical purposes where a strong force is necessary and where water falls were formerly applied: we thought it advisable that James Rumsey should immediately go thither to secure to himself any advantages which might result from an invention so extensively useful in that country, and he accordingly sailed in the month of May, in a vessel bound for London: before he took his departure he signed a petition, which will be presented to the honorable the legislature of your state, stating his several inventions, and praying an act may be passed granting him the exclusive privilege of making and vending them for a reasonable term of years; and at the same time a power of attorney was executed and sent by him to Dr. James McMechin, Joseph Barnes, and Charles Morrow, Esq., authorising them or either of them to attend in person, and solicit for him the granting the prayer of his petition. Joseph Barnes we are informed is a very ingenious mechanic, who has been employed by James Rumsey in constructing his several machines, and is perfectly acquainted with all his inventions, and has abilities adequate to the construction of them in the absence of the inventor. He is also in possession of the models and drafts necessary to show the utility of them, and as soon as exclusive rights therein, for a reasonable term of years shall be obtained from the honorable the legislature of the State of New-York, he will be ordered to attend, as well to carry the said machines into effect as to instruct suitable persons to construct them in his absence.

As the promotion of useful discoveries in the arts and sciences, is an object worthy the attention of enlightened men, and accordingly has in all ages and countries met with patrons amongst those most distinguished for their knowledge, good sense and patriotism, we doubt not but that a scheme, that promises so much improvement, will meet with advocates and support in the general Assembly of New York, over which you so honorably to yourself and to them preside. And we therefore take the liberty to request your countenance to James Rumsey's petition, so far as the prayer thereof shall seem to you consistent with the public good, and if it should not be contrary to the rules of the House, we should take it a particular favor that this letter be read from the chair, in order to bespeak the favorable attention of the honorable members to the subject.

We are with the greatest respect, your assured friends and obedient humble servants,

MIERS FISHER.
BENJAMIN WYNKOOP.
LEVI HOLLINGSWORTH.

The Hon. JOHN LANSING, ESQ.,
Speaker of the House of Assembly.

A LIST OF THE RUMSEIAN SOCIETY.

His Excellency Benj. Franklin, Esq.
Arthur St. Clair.
William Bingham.
Benjamin Wynkoop.
James Tunchard.
John Jones.
Levi Hollingsworth.
Joseph James.
John Wilson.
George Duffield.
Reed & Forde.
Woodrop & Joseph Sims.
William Redwood & Son.
William Barton.
Richard Adams.
Samuel Wheeler.
Samuel Magaw.
Adam Kuhn.
Miers Fisher.
M. F. for Robert Barclay of London.
Charles Vancouver.
Burgis Allison.
John Vaughn.
John Ross.
William Turner.

Endorsed.—A letter from Miers Fisher and others of the Rumseian Society at Philadelphia to the Speaker of the Assembly in New York.

In Assembly, December 18th, 1788.—Read and referred with the petition of James Rumsey, to Mr. Livingston, Mr. Havens and Mr. Van Cortlandt.

[New York Assembly papers.]

No. 1.

PHILADELPHIA, October 18th, 1788.

We whose names are hereunto subscribed do certify that we have been in John Fitch's steamboat, of sixty feet in length, in the river Delaware, when the said boat was propelled through the water with a considerable degree of velocity, regularly and uniformly, without any manual labor, by the force of steam; and we are clearly of opinion that the rivers of America may be navigated by the means of steamboats, and that the present boat would be very useful on the western waters.

JOHN EWING,
ROB'T PATTERSON,
ANDREW ELLICOTT,
JOHN SMILIE,
DAVID REDICK,
JAMES HUTCHENSON,
T. Y. MATLACK,
CHARLES PETTIT,
J. B. SMITH,
DAVID RITTENHOUSE.

No. 2.

This may certify that, on the twelfth instant, we, the subscribers, went in John Fitch's steamboat from this city to the city of Burlington, twenty miles, in the space of three hours and ten minutes, there being upwards of thirty passengers on board; and that said boat was propelled through the water entirely by the force of steam; and from our own observations we are of opinion that the discovery which Mr. Fitch has made may be of much service to inland navigation.

JOHN POOR.
JOHN ELY.

PHILADELPHIA, October 18th, 1788.

No. 3.

On the 16th instant I was on board Mr. Fitch's steamboat, in the river Delaware, saw it perform, and I do certify that it was impelled by the force of steam at the rate of at least four miles an hour, against the strength of tide; and am fully convinced the force applied to that boat would be sufficient to carry it against the most rapid waters between the mouth of French Creek, on the Alleghany, and the mouth of Muskingum, on the Ohio; and that on an average, it would carry it between three and four miles an hour on any of the western waters.

JONA. HEART,

PHILADELPHIA, 18th Oct., 1788. *Capt. 1st U. S. reg't.*

No. 4.

This may certify that I, the subscriber, was one of the committee appointed in March, 1786, by the General Assembly of this State, on the petitions of John Fitch and Arthur Donaldson, respecting their several schemes for the improvement of navigation by means of steam engines, when Mr. Donaldson produced his plan to the committee for drawing water in, at, or near, the bottom, and forcing it out abaft as a means of propelling a vessel forward.

The committee, having fully heard the petitioners, and afterwards viewed Mr. Fitch's model of an invention for moving a boat by means of a steam engine, agreed to make a report to the house in his favor.

JAMES IRVINE.

PHILADELPHIA, August 7th, 1788.

No. 5.

Mr. Fitch, in his explanation of this draft to me, before he presented it to the Philosophical Society, mentioned that his intention of conveying the waters from his forcing pump in a tube that passed through the fire, was that it might thereby be set a boiling before it entered in the receiver, lest the cold water, mixing with the boiling water in the receiver, should impede the generation of the steam.

JOHN EWING.

Endorsed: Presented to the society Sept. 27th, 1785.

R. PATTERSON, *Sec'y.*

No. 6.

I, William Cavenaugh, notary and tabellion public in and for the commonwealth of Pennsylvania, by lawful authority duly admitted and sworn, dwelling in the city of Philadelphia, in the said commonwealth, do hereby certify and attest unto all whom it doth or may concern, that the aforegoing writings, from No. 1 to 6, do contain just and true copies of original certificates to me, the said notary, bona fide produced by John Fitch, in the said certificates named; and that I have carefully compared the said copies with their respective originals, and do find them exactly to agree with each other. And I do hereby further certify that the several gentlemen who have signed and subscribed their names to the said certificates now are, or heretofore have been, in the posts, trusts, or employments hereinafter following their respective names, viz:

John Ewing, Provost of the University and Vice President of the Philosophical Society.

Robert Patterson, Professor of Mathematics and Natural Philosophy, and *one of* the secretaries of the Philosophical Society.

Andrew Ellicott, Professor of Mathematics and Astronomy in the Episcopal Academy.

John Smilee, present member of the honorable the Supreme Executive Council for the commonwealth of Pennsylvania.

David Redick, Vice President of the S. E. Council aforesaid.

James Hutchenson, one of the secretaries of the Philosophical Society.

Timothy Matlack, late secretary to the S. E. Council aforesaid.

Charles Petet, late member of Congress for the commonwealth aforesaid.

Jonathan Bayard Smith, late prothonotary of the court of common pleas for the city and county of Philadelphia.

David Rittenhouse, treasurer for the commonwealth aforesaid.

John Poor, teacher of the Young Ladies' Academy.

John Ely, teacher of Arch street School.

Jonathan Heart, Captain of the first United States regiment.

In testimony whereof, I, the said notary, have hereunto set my hand, affixed my seal of office of notary at Philadelphia aforesaid, the twelfth day of December, in the year of our Lord one thousand seven hundred and eighty-eight.

WM. CAVENAUGH,
Notary Public, &c, 1788.

To the honorable the Representatives for the commonwealth of Pennsylvania:

The petition of John Fitch, of the city of Philadelphia, humbly sheweth—

That he hath this morning seen with surprise in the public papers, that a petition has been presented to your honorable body by James Rumsey, praying you to grant him an exclusive right to the use of steamboats, the very right which, by special act of Assembly, passed the 28th of March, 1787, is vested in your petitioner, who is confident he need do no more than remind the honorable house that such a law exists, when he conceives it will be even unnecessary to pray that you will *not grant* that to another which has already been granted to him. Justice, honor, and dangerous precedent forbid the depriving an honest citizen of the fruits of his dear-earned labor, and to whom the faith of the government has been so solemnly pledged; the very attempt to draw the house into such a measure is, your petitioner conceives, offering them the greatest indignity. Your petitioner's property in the exclusive right to all steamboats in the State of Pennsylvania is as firmly established in him as the right of any man in the State to his house or his farm. He therefore trusts that honor of the house to protect him from so cruelly an intended injury. And your petitioner, as in duty bound, shall ever pray.

JOHN FITCH.

PHILADELPHIA, September 6th, 1788.

A true copy from the original, read September 6, 1788.

J. SHALLUS,
Ass't Clk of the General Assembly.

To the honorable the House of Representatives of the freemen of the commonwealth of Pennsylvania:

The petition of Henry Voight, of the city of Philadelphia, humbly sheweth—

That your petitioner has long turned his attention to improvements in mechanics, and he presumes was not an unuseful citizen during the war, as his various manufacturing machines will evince. Since the building of Mr. Fitch's steamboat, your petitioner has been much consulted, employed, and

in part interested in its completion; that during the many experiments and consultations about the best mode of constructing an engine on board a boat, your petitioner foresaw the great inconvenience of the usual mode of boiling water; and among a number of other projects, your petitioner conceived that water might be boiled in a pipe, a drawing of which he made in the spring of 1786, and in June showed it to Timothy Matlack, esq., and Mr. John Nacarrow, both of them gentlemen of great mechanical knowledge, from whom he hath obtained certificates; but Mr. Fitch was advised not to go out of the old way. The attempt, therefore, first made on the steamboat was with the accustomed heavy boiler, which so loaded the boat that Mr. Fitch determined to take it out and introduce a boiler more suited to the purpose. Accordingly, preparations were made for a *pipe boiler*, which is now executed, and the boat working with it, exactly on the principles and form exhibited to Mr. Matlack and Mr. Nacarrow. Your petitioner, hearing that a Mr. Rumsey was to come to town, and that he pretended to the exclusive right to a pipe boiler, your petitioner made an entry of his said boiler with the prothonotary of the court of common pleas of the city of Philadelphia, being told the copy-rights of books were there entered, and he conjectured such entry in a public office might secure to him in Pennsylvania the exclusive right to the same, as death, in such case, would not deprive the public of the discovery.

Your petitioner therefore humbly prays your honorable House will be pleased to grant to him and his heirs the exclusive right to the emoluments of the same for the term of fourteen years, or such term as the honorable House may think it deserves—and your petitioner, as in duty bound, &c.

HENRY VOIGHT.

PHILADELPHIA, September 6th, 1788.

A true copy from the original.

J. SHALLUS,

Assistant Clerk of the General Assembly.

The committee to whom was referred the petition of James Rumsey, John Fitch and Henry Voight beg leave to report—

That having examined the said petitions, and with great attention heard the parties in support of their respective claims, are unanimously of opinion that the law which grants to John Fitch an exclusive right to all boats propelled by fire and steam, hath not only secured unto him, his heirs, &c., the exclusive right to the method he had then invented, for the purpose of applying the powers of fire or steam in order to propel boats, but also whatsoever improvements he may make himself, or obtain from others, during the time limited by said law. And however improper so extensive a law may be in its principles, yet considering that upon a faith of the said law, several citizens have spent much labor and money, for which they are not yet reimbursed—and notwithstanding the Legislature may have a right to repeal laws which convey grants that are highly injurious to the general welfare, yet the resuming such legislative grants ought never to be done, unless upon the most pressing necessity.

Your committee therefore beg leave to offer the following resolutions, viz:

Resolved, That the prayer of the petition of James Rumsey be granted, excepting so far as it respects the propelling of boats by the force of fire or steam.

Resolved, That the prayer of the petition of Henry Voight cannot be granted.

The above is a true copy of the original report remaining on the files of the General Assembly.

J. SHALLUS, *Assistant Clerk.*

PHILADELPHIA, 13th December, 1788.

HONORED SIR,—As it is so very inconvenient for me to attend your Assembly this session, to answer the repeated vexatious claims of James Rumsey, I have taken the liberty to enclose to you, a petition to your honorable House, several certificates, a pamphlet, a report of the committee of Pennsylvania, &c., all which I pray you to lay before your honorable House.

There is one part of the pamphlet which may require a little explaining, as they hinge much, and their whole dependance of the pipe boiler rests on it; where speaking of Mr. Voight, and the pipe boiler, page 14, I say that I am indebted to him alone for the improvement, yet it cannot be denied but I laid a drawing of a pipe boiler before the Philosophical Society many months before he pretends to have [done so;] therefore I hope your House will not [conceive his words] to convey more than the very expression itself, [and that they] may not be construed instead of an improvement that they shall convey the idea that I am indebted to him for the invention.

I am hardly let in a belief that your honorable House will take up his petition, but refer it over to Congress; yet should they do it, I pray that I may be notified of it.

I also pray you, sir, as soon as this shall come to hand to let me have information by post, otherwise, for fear of miscarriage, in a reasonable time I shall have to be at the expense and trouble of forwarding another package to you, which will ever lay me under the obligation of subscribing myself

Your most devoted, much obliged, and very humble servant,

JOHN FITCH.

To the honorable the Speaker of the Assembly of New York.

Endorsed—John Fitch; papers and certificates relative to his steamboat—1789.

[Addressed]—Honorable Speaker of the General Assembly of the State of New York, at Albany.

This may certify that I have been made acquainted with Mr. John Fitch's plan of propelling vessels through the water by the force of steam: and if it should answer in practice as well as in theory, I am of opinion that it promises success, and deserves the notice of the Legislature.

CHRISTOPHER COLLES.

NEW YORK, February 22d, 1787.

State of Pennsylvania, in General Assembly.

Friday, September 8th, 1786, A. M.

The report, read September 6th, on the petition of John Fitch, was read the second time as follows, viz:

The committee on the petition of John Fitch report, that they have received his model of an invention for moving a boat by means of a steam engine, of which they entertain a favorable opinion.

That the said Fitch represents to the committee, that he has begun a boat for navigating on the river Delaware; but which, from the narrowness of his funds, he shall not be able to complete without some public assistance.

The committee, conceiving the design, if executed, will be of considerable public utility, recommend the following resolution:

Resolved, That a committee be appointed to bring in a bill to authorise the supreme executive council to direct payment of John Fitch's drafts to any amount not exceeding in the whole the sum of one hundred and fifty pounds, on proof made to them that the money so drawn for has been applied to the purpose of completing his steamboat, they taking his security for repayment thereof in twelve months.

And on the question, will the House adopt the same report? it was carried in the negative.

Extract from the minutes.

J. SHALLUS, *Assistant Clerk.*

Your committee on the petition of John Fitch report,

That they have viewed his boat, which he proposes to propel against the stream by the agency of steam, and although the apparatus necessary to the same is not yet so complete as to afford demonstration, yet your committee entertain no doubt of a full and effectual completion thereof.

In order, therefore, to encourage a further improvement in so useful an art, propose the following resolution:

Resolved, That the petitioner have leave to bring in a bill agreeably to the prayer of his petition.

The above is a true copy of the original remaining on the files of the General Assembly, and whereupon the resolution of the House of the 16th of November last was founded, Philadelphia, February 20th, 1787.

J. SHALLUS,
Assistant Clerk of the General Assembly.

The Committee to whom was referred the petition of John Fitch, of Bucks county, in Pennsylvania,

Report—That having examined the certificates and other papers presented to your Committee by the said John Fitch, they are of opinion that in order to encourage a further improvement in so useful an art; a bill be brought in for the purpose of granting to the said John Fitch an exclusive right of navigating boats by the force of steam or fire, for a certain time, agreeable to the prayer of his petition.

To the honorable the Legislature of the state of New York, in Senate and Assembly convened.

The petition of John Fitch, of Bucks county, in the state of Pennsylvania, humbly sheweth—

That your petitioner has lately invented a method of propelling vessels through the water by the force of steam, which he flatters himself is reduced to a moral certainty, and will be a very great improvement on navigation, and that he has a boat nearly completed, to navigate on the river Delaware by the agency thereof.

That the states of New Jersey and Delaware have patronized his scheme, so far as to give him an exclusive right for said boats for the term of fourteen years, and the state of Pennsylvania have passed a law for public consideration similar thereto—That your petitioner has invented a method of rowing boats by oars worked by cranks, which was never heretofore used, which ap-

plies not only to the force of steam, but the strength of a horse, or any other power, to equally as good advantage as men with oars, whereby inland navigation must be benefited nearly as much as the labor of horses is cheaper than the labor of men. Your petitioner therefore humbly prays that your honorable body will take into their consideration said improvements, and grant your petitioner such encouragement as in their wisdom shall seem proper. And your petitioner, as in duty bound, shall ever pray.

JOHN FITCH.

New York, February 21st, 1787.

[Endorsed,]—No 147. A petition of John Fitch, praying an exclusive privilege for a limited time of constructing vessels to be propelled through the water by the force of steam.

In Assembly, February 24th, 1787, read and referred to Mr. Sickles, Mr. Jones and Mr. Hamilton.

February 27th, 1787.—Mr. Sickles reported—see the report annexed—a bill was brought in pursuant to the prayer of the petition.

To the honorable the representatives of the state of New York, in General Assembly met:

Gentlemen:—Whereas your petitioner has formed a plan for facilitating the navigation of rapid rivers; he therefore doth propose to construct a certain species of boat, of the burthen of ten tons, which shall sail or be propelled by the combined influences of certain mechanical powers thereto applied, the distance of between twenty-five to forty miles per day, against the current of a rapid river, notwithstanding the velocity of the water should move at the rate of five miles per hour and upwards; with the burthen of ten tons on board to be wrought at no greater expense than that of three hands; and as a premium for so useful an invention, your petitioner prays for an act to pass this honorable house of Assembly, granting to your petitioner, his heirs and assigns, the sole and exclusive right of constructing, navigating and employing boats constructed after his new invented model, upon each and every creek, river, bay, inlet and harbor within the limits and jurisdiction of this commonwealth, for and during the term of ten years, fully to be completed and ended, to be computed from the first day of January, 1785, provided always, that the legislature of this commonwealth may at any time abolish the exclusive right herein prayed for, by paying to your petitioner, his heirs or assigns, the sum of ten thousand pounds in gold or silver, and your petitioner, as in duty bound, shall pray. JAMES RUMSEY.

[Endorsed,]—*James Rumsey's petition to the state of New York.*

GENERAL WASHINGTON'S OPINION OF MR. RUMSEY'S INVENTION.

I have seen the model of Mr. Rumsey's boats, constructed to work against stream, examined the powers upon which it acts; been eye witness to an actual experiment in running water of some rapidity; and give it as my opinion (although I had little faith before) that he has discovered the art of working boats by mechanism and small manual assistance, against rapid currents; that the discovery is of vast importance, may be of the greatest usefulness in our inland navigation; and if it succeeds, of which I have no doubt, that the

value of it is greatly enhanced by the simplicity of the works, which, when seen and explained to, may be executed by the most common mechanic.

Given under my hand at the town of Bath, county of Berkeley, in the state of Virginia, this 7th of September, 1784.

GEORGE WASHINGTON.

A true copy compared with the original.

NEW YORK, Dec. 3, 1784.—I do certify that I have seen the original, of which the within is a copy, and believe the whole to have been written by General Washington, with whose handwriting I am perfectly acquainted.

BEN WALKER.

Formerly Aid de Camp to his Excellency, Gen. Washington.

[Endorsed,]—A copy of Gen. Washington's voucher.

PHILADELPHIA, Dec. 9th, 1788.

SIR:—I think it proper to inform you that I am about to set off for Albany, where I propose to be on the 15th inst. in order to present a petition to the Legislature of the State of New York in behalf of Mr. James Rumsey, praying a grant of the exclusive privilege of constructing and using within that State his model of propelling vessels by the force of steam, and the boilers by him invented for generating steam, in order that you may be heard if you think proper to attend. Yours, &c.,

JOSEPH BARNES.

Attorney for James Rumsey.

MR. JOHN FITCH.

On the tenth day of December, Anno Domini, one thousand seven hundred and eighty-eight, before me Clement Biddle, Esquire, Notary and Tabellion public for the commonwealth of Pennsylvania, duly commissioned and qualified, and one of the Justices of the court of common pleas for the city and county of Philadelphia, dwelling in the said city personally, came George Kemp, who being duly sworn on the holy Evangelists of Almighty God, did depose and say, that on the day of the date hereof, at the request of Joseph Barnes, attorney for James Rumsey, he went to the dwelling or lodging of Mr. John Fitch, and in presence of Joseph Barnes, attorney for James Rumsey as aforesaid, delivered to the said John Fitch a true copy of the paper writing contained on the other side hereof, and further saith not.

GEORGE KEMP.

Sworn as above before me quod attestor,

CLEMENT BIDDLE, Notary Public and J. C. C. P., 1788.

RICHMOND, November 17th, 1784.

Virginia,—To all whom it may concern.

I do hereby certify that a bill "giving unto James Rumsey, his heirs and assigns, the sole and exclusive right of constructing, navigating and employing boats after his new invented model, for the term of ten years, to be computed from the first day of January next," has passed the house of delegates of this State, with this proviso; "that the exclusive right therein granted, may at any time be abolished by the Legislature of this commonwealth, upon the payment unto the said Rumsey, his heirs or assigns, the sum of ten thousand pounds in gold or silver, and that the said bill is to be sent up to the Senate for their concurrence, as soon as they shall have formed a house.

JOHN TYLER, S. H. D.

New York, ss:—James McMechen of Berkeley county, in Virginia, being duly sworn on the holy Evangelists, deposeth and saith, that the above is a true copy of a certificate in his possession, subscribed with the name of John Tyler, speaker of the house of delegates of Virginia, that the deponent knows the handwriting and subscribing of the said John Tyler, and does verily believe his name subscribed to the said certificate to be of the handwriting of the said John Tyler. That the said certificate was delivered to the deponent by the said James Rumsey therein named, at the city of Richmond, in Virginia, at which time and place several of the gentlemen of the house of delegates were present, and did see and read the said certificate—and further the deponent saith not. JAMES McMECHEN.

Sworn the third day of December, 1784, before me,

JOHN McKESSON, Notary Public.

To the honorable the Legislature of the State of New York in Senate and Assembly convened:

The petition of James Rumsey, of Berkeley county, in the State of Virginia, by James Barnes, at present of the city of Philadelphia, his attorney for the special purpose duly constituted, most respectfully sheweth—

That your petitioner hath invented a mode of raising water in great quantities to any height from below or above the surface of the earth, by means of steam acting upon two pistons at the same time, whereby mines may be drained, cities or farming grounds be watered, and mills supplied with a constant stream, at an expense far less than by any mode hitherto used or invented. A draft or specification of which invention, with an explanation of its use, is ready to be delivered to this honorable House, and to be filed on record in any public office which they may think most proper to preserve the same.

Your petitioner therefore prays that this honorable House will be pleased to give him leave to introduce a bill to be enacted into a law, granting and securing to your petitioner, his executors, administrators, and assigns, the exclusive right and privilege of making, constructing, and using machines for raising water, for all purposes whatsoever, by the action of steam applied to two pistons at the same time, in the manner and upon the principles by him invented and defined in the said draft, explanation and specification.

And your petitioner, &c.

JAMES RUMSEY,

By Joseph Barnes, his attorney.

[Endorsed]—No 52. 1788.

A petition of James Rumsey, by Joseph Barnes, his attorney, praying an exclusive right of making, constructing, and using machines for raising water, (by means of steam,) for all purposes whatever.

In Assembly, December 23d, 1788—read and referred to Mr. G. Livingston, Mr. Havens, and Mr. Van Cortlandt.

The committee to whom were referred the petition of James Rumsey, setting forth that he hath invented a new method of propelling boats by steam, and hath made improvements in divers engines and machines, and praying for an exclusive right to the same for a limited time; and the petition of John Fitch, praying that the prayer of the petition of the said James Rumsey

may not be granted; and the petition of John Stevens, setting forth that he hath invented a method of propelling boats by steam, that does not interfere with the pretensions of either the said James Rumsey or John Fitch; report—

That they have examined the petitions of the said James Rumsey and John Fitch, with the papers and affidavits accompanying the same, and are of opinion that the said James Rumsey hath by actual experiment ascertained the practicability of propelling boats by the agency of steam, in a mode and on principles different from those heretofore used by the said John Fitch; but that the act securing to John Fitch the exclusive right of propelling boats by the force of fire or steam for a limited time, is conceived in such general terms that it would be improper to vacate any part of the said grant, without giving both the parties a hearing. But the committee are further of opinion, that nothing in the said act, securing to John Fitch the exclusive right of propelling boats by fire or steam, can be construed to prevent the legislature from securing to James Rumsey, for a limited time, the exclusive right of generating steam by his new invented method of a pipe boiler. And, further, that they have examined the petition of John Stevens, and the draughts accompanying the same, and are of opinion that the method proposed by him for propelling boats by steam does not materially differ in its principles from the mode proposed by James Rumsey; and that he stands in the same situation with respect to John Fitch as the said James Rumsey. And, further, that the committee have prepared the draught of a bill securing to James Rumsey the exclusive right to his inventions for a limited time, which they have directed their chairman to report to the House.

To the honorable the legislative council and General Assembly of the State of New York:

The petition of John Fitch, of the city of Philadelphia, humbly sheweth,

That your petitioner received notice, on the 10th of this instant, from Joseph Barnes, attorney for James Rumsey, that he was about to petition your honorable House for an exclusive right to a steamboat and a pipe boiler.

Your petitioner humbly begs leave to represent, that by a law passed in the year 1787, your honorable legislature vested in your petitioner the exclusive right, for a term of years, of propelling vessels through the water by the agency of steam, which exclusive right hath also been granted him in the States of New Jersey, Pennsylvania, and Delaware, to whose several legislatures James Rumsey had made application, with a view of destroying the right of your petitioner, under the pretence of using a different mode in application of steam to the propelling of boats, and also under a pretence of an invention of boiling water in a pipe, for the purpose of creating steam, which idea of boiling in a pipe was by your petitioner laid before the Philosophical Society in Philadelphia, some months before the time assumed by the said Rumsey as the period of his first invention, and that the mode of propelling by forcing water out abaft, which he claims as his invention, was published by M. Bernoulli, in the year 1738, consequently, was open to common use, and thereby included in the law to your petitioner.

Your petitioner hath successfully opposed the said Rumsey in his applications to the said Assemblies, and hath hitherto preserved his rights inviolate. The report of the committee of seven, leading members of the honorable Assembly of Pennsylvania, after a debate of five days, supported on the side

of Mr. Rumsey by an eminent attorney at law, your petitioner begs leave to annex herewith. Since which he has made two fruitless attempts to destroy my just and legal rights in the States of Delaware and New Jersey.

In Virginia your petitioner hath also obtained an exclusive right, being the State in which said Rumsey resided, without the least opposition from him or any of his friends, notwithstanding from my first petitioning that Assembly, to obtaining the law, was more than one year and eleven months; your petitioner hath not hitherto been informed whether he has made application in that State or not, but doubts not, from the justness and stability of that honorable body, that they will not take his just rights from him without hearing the defence of your petitioner.

Your petitioner therefore humbly prays, that in case a petition should be presented by the said attorney, which may interfere with your petitioner's rights, either in the steamboat or the pipe boiler, so long in use in your petitioner's boat on the river Delaware, and a machine necessary for the completion of that design for which your law was given, he humbly prays to be heard in the defence of his rights. Your petitioner is perfectly willing to rest the justice of his claim either before your honorable House, or before the new Congress, if your honorable House should judge it most expedient to refer the same to them.

Your petitioner begs leave to observe, that such repeated vexatious applications seem calculated to divert your petitioner from pursuing the business of the boat, or to promote a clashing of laws amongst the different States, or to destroy his resources in defending his just rights, and prevent him from completing the great undertaking he has now on hands.

Your petitioner humbly begs leave to represent, that he hath expended a great portion of his time and a great sum of money in perfecting said boat, in full confidence of enjoying an uninterrupted possession of the several grants to him made.

Under the said confidence a number of gentlemen have advanced money, to a very considerable amount, hoping to benefit themselves as well as their country thereby. Your petitioner therefore humbly prays that the grant made to him, may not be permitted to be violated or invaded by a subsequent pretender, and considering the very great and expensive journey, and my inabilities to perform it, not only on account of the great expense but the infirmities of body occasioned by rheumatic pains, and the great confidence reposed in your honorable legislature of keeping inviolate the solemnities of their laws. However convenient it might be for me to attend, I am of opinion that it would be altogether unnecessary.

But should your honorable house think proper to take up the business, I humbly pray that I may be seasonably notified by your honorable house for the defence of my just and legal rights, and that they may not be taken from me without the opportunity of being heard in my own defence.

Your petitioner humbly begs leave to refer your honorable house to the annexed papers and pamphlets, accompanying this:

And your petitioner as in duty bound will ever pray.

JOHN FITCH.

To the honorable Legislature of the State of New York in Senate and Assembly convened.

THE PETITION OF JAMES RUMSEY OF BERKELEY COUNTY, IN THE STATE OF VIRGINIA, most respectfully sheweth,—

That your petitioner has been several years employed, with unremitted attention, and at a great expense, in inventing, and bringing to perfection, sundry machines and engines; namely, one for propelling boats on the water, by the power of steam, which has been already accomplished in experiments, on a boat of about six tons burthen; another machine, constructed on similar principles, for raising water at a small expense, to be applied to the working of mills of different kinds, as well as to various useful purposes in agriculture; a new invented boiler for generating steam; and also other machines, by means of which, grist and sawmills may be so improved in their construction, by a very cheap, and simple machine, as to require the application of much less water, than is necessary in the common mode.

Your petitioner humbly conceives, that advantages of great importance to the agriculture and mercantile interests of the United States, may be derived from the use and employment, therein, of the before mentioned engines and machines; but he begs leave to represent to the honorable legislature, that, without some encouragement and support from the government, he will not be enabled to prosecute his discoveries, and to carry his aforesaid inventions and improvements into execution; whereby the public would be deprived of the benefits that might result from them; and your petitioner greatly injured, by the sacrifices he has made of his time and property.

Your petitioner deems it necessary, in this stage of his application to your honorable body, to enter into a detail of the nature and principles of the improvements, to which his present petition relates: he therefore takes the liberty of referring to the printed papers, herewith presented, for further information on the subject, and he flatters himself, that, on mature consideration, your honorable body will be fully satisfied, both of the practicability of his plans, and of their importance, as an object of great public utility. Under this impression, he respectfully solicits the patronage of the legislature of this State.

Your petitioner therefore prays, that the honorable legislature, as the guardians and trustees of the public prosperity, will be pleased to enact a law, granting as a reward for his before mentioned inventions and improvements, an exclusive right to him, his executors, administrators and assigns, of constructing, navigating and employing, for a certain term of years, within this State, the several boats, engines, and machines, by him invented and improved.

And your petitioner humbly submits to the judgment of this house, whether in consideration of the great expense he has already incurred in the prosecution of his objects, and the further charges which must necessarily attend the completion of his plans, the exclusive right prayed for, should not be vested for such a term, as might afford him an honorable compensation, proportioned to his services. JAMES RUMSEY.

[Endorsed,] James Rumsey's petition. 1788.

In Assembly, December 18th, 1788.—Read and referred with the pamphlet and papers attending the same, to Mr. G. Livingston, Mr. Havens and Mr. Van Cortlandt.

Extract from the printed minutes of the Assembly of the State of Virginia.

Saturday, November 15th, 1788.—"A petition of James Rumsey, by George Morrow his attorney in fact, was presented to the house and read, setting forth, that he is the original discoverer and inventor of sundry machines and engines, for propelling boats on the water by the power of steam;

for which an exclusive privilege was granted by an act of the last Assembly, to a certain John Fitch, that he is well prepared to prove his prior claim to the said discovery, as also to manifest the advantages thereof, and praying that the act in favor of the said John Fitch, may be repealed.

"Ordered that the said petition be referred to Mr. Trage, Mr. Henry, Mr. Randolph, Mr. Carlins, Mr. Bland, Mr. White, Mr. David Stuart, Mr. Carrington and Mr. King, that they do examine the matter thereof and report the same, with their opinion thereupon to the House."

Thursday the 20th of November, 1788.—"The speaker laid before the house a letter and petition of John Fitch, praying that he may still enjoy the exclusive privilege of conducting steamboats within this state, which was granted to him, by an act of the last sessions of Assembly; and, that all attempts to interfere with this right, may be disregarded; which was read and ordered to be referred to the committee, to whom the petition of James Rumsey was referred."

Friday the 21st of November, 1788.—"Mr. David Stuart reported from the committee, to whom the petitions of James Rumsey and John Fitch were committed, that the committee had according to order, had the same under their consideration, and had agreed upon a report, and came to several resolutions thereupon, which he read in his place, and afterwards delivered in at the clerk's table, when the same were again twice read, and agreed to by the house as followeth:"

"Whereas, James Rumsey hath complained to the general Assembly, that the exclusive privilege granted to John Fitch, by the act entitled 'An Act granting to John Fitch the exclusive privilege of constructing and navigating boats impelled by fire or steam for a limited time,' hath been obtained to the injury of him the said James Rumsey, upon a misrepresentation, that the said John Fitch was the original author of the invention therein mentioned:

"And whereas, it appears to the satisfaction of your committee, from the testimony produced to them, that the said Rumsey's representation is just, and that he is the original author of the invention mentioned in the said act.

"Resolved, That it is the opinion of this committee, That the act passed at the last session of the general Assembly, entitled 'An Act granting to John Fitch the exclusive privilege of constructing and navigating boats impelled by fire or steam, for a limited time' ought to be repealed.

"Resolved, That it is the opinion of this committee, That the petition of the said John Fitch, in opposition thereto be rejected.

"Ordered, that a bill or bills be brought in, pursuant to the last resolution, and that the said committee, do prepare and bring in the same."

A true extract from the minutes. Examined by

GILBERT LIVINGSTONE.

11th February, 1789—Albany.

[Endorsed,] Extract from the minutes of the House of Assembly of Virginia, on the petition, &c. of James Rumsey.

An ACT for vesting in JAMES RUMSEY, Esquire, the exclusive right and privilege of making, using and vending divers engines, machines and devices, by him invented, or improved, for a term of years therein mentioned.

Whereas, James Rumsey, of Berkeley county, in Virginia, hath represented to this house, that he hath invented, or improved divers engines, machines,

and devices, hereinafter particularly mentioned, upon principles and constructions not before used, and by actual experiments, hath demonstrated the practicability and utility thereof, and hath in the office of plans of the said several inventions and improvements, with explanations thereof, in order particularly to designate and distinguish them from other engines, machines, and devices heretofore used for purposes somewhat similar. Which engines, machines and devices are called by the following names, and known by the following distinguishing characters, viz:

Rumsey's Pipe Boiler, for the more ample and easy generating of steam by passing a small quantity of water through an incurvated tube, placed in a furnace, whereby the action of fire is communicated to the water and steam in all its passage from the entrance to the exit, and which kind of boiler can be easily adapted to every species of fire or steam engines.

Rumsey's Steamboat, a practical mode of propelling vessels by means of the reaction of a stream of water, forced by the agency of steam through a trunk or cylinder, parallel to the keel, out at the stern.

Rumsey's Improvement upon Savery's Machine, or steam engine, whereby water may be raised in great quantities to any reasonable height, for the turning of mills, or for agricultural or other purposes.

Rumsey's Improvement upon Doctor Barker's Mill, a mode by which millstones and other machinery, requiring a circular or retrograde motion, may be turned by or worked with a smaller quantity of water than by any plan yet exhibited to the public, and entirely free from the difficulties which prevented Doctor Barker's invention from coming into use.

Rumsey's Cylindric Saw Mill, or a mode by which mill saws and all other machinery, requiring an alternately opposite motion, whether perpendicular or horizontal, may be worked without the loss of the weight or force of any part of the water used.

And Whereas, it is highly proper, that ingenious men who by their labors and study contrive and invent improvements in arts and sciences, should be rewarded by the community, in proportion to the advantages resulting from the usefulness of their inventions; and as the most proper mode of ascertaining the utility of any new invention or improvement, must be experience, and as the exclusive right and privilege of making, using and vending to others, such newly invented engines, machines and inventions, is not only the most cheap and frugal, but the most certain way of rewarding inventors according to their several merits,

It is therefore hereby enacted, by the

and by the authority of the same, that from and after the passing of this act, the said JAMES RUMSEY, his executors, administrators and assigns, shall have the sole and exclusive right, liberty and privilege within the State, of making, using and vending to others, the said *boiler* for generating steam, so as aforesaid described, and called *Rumsey's pipe boiler*; the said *steamboat* to be propelled through the water by means of the reaction of a stream of water forced by steam through a trunk or cylinder from the stern of the boat, against the surrounding water, so as aforesaid described, and called *Rumsey's steamboat*; the said improvement of *Savery's engine*, for raising water for the turning of mills, or for agricultural or other purposes, so as aforesaid described, and called *Rumsey's* improvement upon *Savery's* machine, or *steam engine*; the said mode for turning mill stones, and other machinery requiring a circular or retrograde motion, called *Rumsey's* improvement upon *Doctor Barker's* mill, and the said mode of working saw-mills, and other machines requiring an alter-

nately opposite motion, perpendicular or horizontal, called *Rumsey's saw-mill*; all which engines, machines and devices, are more particularly defined and described in the said plans and explanations so as aforesaid filed of record in the office of and to which definitions and descriptions for farther certainty, this act particularly refers.

And it is hereby further enacted by the authority aforesaid, that no person or persons whomsoever, shall make, use or vend to others to be used, any or either of the inventions or improvements so as aforesaid described or defined in this act, or in the plans or explanations filed of record in the said office, and hereby referred unto; or any engine, machine or device whatsoever, formed or contrived upon the same principles therewith, although the form thereof may be varied, under the penalty of forfeiting to the said James Rumsey, his executors, administrators or assigns, the sum of lawful money of this State; and moreover forfeiting to him and them, all and every such engine, machine and device, so as aforesaid to be contrived, made, used or vended within this State; the said penalty to be recovered by action of debt, founded upon this act, wherein no essoine, protection or wager of law, nor more than one imparlance, shall be allowed, and in the execution to be issued upon any judgment obtained in pursuance of this act, a clause shall be inserted, commanding the sheriff or other proper officer to deliver the said engine, device or machine, to the plaintiff if it can be conveniently removed; but if not, that then and in such a case, the said sheriff, or other proper officer shall cause the same to be prostrated, destroyed and rendered useless, any law to the contrary notwithstanding.

And it is further enacted by the authority aforesaid, that the sole and exclusive right and privilege for making, using and vending the engines, machines and devices aforesaid, by this act granted to the said James Rumsey, his executors, administrators and assigns, shall continue for the term of years from the time of passing this act, and no longer: And that all actions to him or them accrued, or accruing within the said term, shall remain in full force, during and after the expiration of this act.

[Endorsed,]—Act for vesting in James Rumsey, &c., &c.

To the honorable the Legislature of the State of New York, in Senate and Assembly convened.

The petition of JOHN STEVENS, Jun'r, of Hoboken, in the State of New Jersey.

That your petitioner has bestowed a great deal of time and thought towards perfecting a machine for propelling a vessel through the water by means of steam. That he has at length brought his invention to that degree of perfection. That as he conceives little or no further improvement can be made on it. That to the best of his knowledge and belief, his scheme is altogether new, or at least does not interfere with the inventions of either of the gentlemen who have applied to your honorable body for an exclusive right of navigating by means of steam.

That your petitioner has made an exact draught of the different parts of his machines, which with an explanation thereof, he is ready to exhibit, provided that after the exhibition thereof, no one be suffered to lay claim to any invention therein described, unless he shall have before exhibited a draught or model thereof to your honorable body; and your petitioner therefore prays that in case his machine should appear to be a new and useful invention, that the honorable the Legislature would be pleased to grant to him an exclusive privi-

lege and right of using the same for the purposes of navigation throughout the State of New York, for such term of years as shall seem meet. And your petitioner shall ever pray.

JOHN STEVENS, Jun'r.

Presented 9th January, 1789.

* The law passed by the Legislature of N. Y. in Mr. Fitch's favor, is entitled "An Act for granting and securing to John Fitch the sole right and advantage of making and employing for a limited time, the steamboat by him lately invented." It is dated 19th March, 1787, and will be found in Greenleaf's Ed. of the laws of the State of New York, 1792, Vol. I, c. LVII. Further information on the subject of early steam navigation can be had by reference to a history of the steamboat case, Trenton, 1815; Colden's life of Fulton, New York, 1817; Duer's letter to Col: D. Colden, Albany, 1817; Colden's answer to Mr. Duer, Albany, 1818, &c.

MARYLAND.

STATE DEPARTMENT,
Annapolis, Md., Nov. 26, 1849.

SIR:—

Since the receipt of your communication of the 8th inst., addressed to his excellency the Governor of this state, I have examined with much care the indexes, of all the records of the proceedings of the Governor and Council, and of the Houses of Burgesses from 1642, as also the alphabetted archives of the Legislatures from 1776, to comply with your request.

I have been able to discover nothing with reference to the subject matter of that communication, other than the copies herewith sent.

I am, very respectfully,
Your obedient servant,
JOHN NICK WATKINS,
Secretary of State.

THOMAS EWBANK,
Comm'r of Patents, Washington, D. C.

The Petition of James Rumsey of Berkeley County, in the State of Virginia,

Most respectfully sheweth, that your petitioner has been several years employed with unremitted attention, and at a great expense in inventing and bringing to perfection sundry machines and engines; namely, one for propelling boats on the water, by the power of steam, which has been already accomplished in experiments on a boat of about six tons burthen; another machine, constructed on similar principles, for raising water, at a small expense, to be applied to the working of mills of different kinds, as well as to various useful purposes in agriculture; two new invented boilers for generating steam, and also other machines, by means of which, grist and sawmills may be so improved in their construction by a very cheap and simple machine, as to require the application of much less water than is necessary in the common mode.

Your petitioner humbly conceives that advantages of great importance to the agriculture and mercantile interests of the United States, may be derived from the use and employment therein, of the before mentioned engines and machines: but he begs leave to represent to the honorable legislature, that without some encouragement and support from government he will not be enabled to prosecute his discoveries, and to carry his aforesaid inventions and improvements into execution, whereby the public would be deprived of the benefits that might result from them; and your petitioner greatly injured by the sacrifices he has made of his time and property.

Your petitioner deems it unnecessary in this stage of his application to your honorable body, to enter into a detail of the nature and principles of the improvements to which his present petition relates. He therefore takes the liberty of referring to the printed papers herewith presented for further information on the subject, and he flatters himself that on mature consideration your honorable body will be fully satisfied, both of the practicability of his plans and of their importance, as an object of great public utility. Under this impression he respectfully solicits the patronage of the legislature of this state.

Your petitioner therefore prays that the honorable legislature as the guardians and trustees of the public prosperity, will be pleased to enact a law granting as a reward for his before mentioned inventions and improvements, an exclusive right to him, his executors, administrators and assigns, of constructing, navigating and employing for a certain term of years, within this state, the several boats, engines and machines, by him invented and improved.

And your petitioner humbly submits to the judgment of this house, whether in consideration of the great expense he has already incurred in the prosecution of his objects, and the further charges, which must necessarily attend the completion of his plans, the exclusive right prayed for, should not be vested for such a term as might afford him an honorable compensation proportioned to his services.

(Signed) JAMES RUMSEY.

On the back of the foregoing petition is endorsed, to wit:

"Read 11th Nov. 1783, and referred to the next session of Assembly."

An Act to invest James Rumsey with an exclusive privilege and benefit of making and selling new invented boats, on a model by him invented.

Whereas, James Rumsey by his petition to this General Assembly, hath set forth that he hath invented a plan for navigating boats against the current of rapid rivers, at a very small expense, whereby great advantages will redound to the citizens of this state, and has prayed that an act may pass, vesting in him, a sole and exclusive right, privilege and benefit, in constructing, navigating and employing boats constructed after this new invented model, upon the creeks, rivers and bays within this state, be granted to him, his executors, administrators and assigns, for a limited time; and it appearing reasonable that the said James Rumsey should have the benefit and advantage of his said invention:

Be it enacted by the General Assembly of Maryland, That the exclusive right, privilege and benefit of making, constructing, selling within this state, the said new invented boats, or improvements upon the said plan, shall be and is hereby vested in the said James Rumsey, his executors, administrators and assigns, for and during the space of ten years from the end of this session of Assembly.

And be it enacted, That if any person, during the said term of ten years as aforesaid, shall make, construct, vend, sell within this State any such invented boats or vessels, without a license in writing first had and obtained from the said James Rumsey, his executors, administrators, or assigns, for that purpose, or shall purchase or use such invented boat or vessel as aforesaid within the term aforesaid, made by any persons other than the said James Rumsey, *his* executors, administrators or assigns, or by some person licensed by him or

them for that purpose, every person so making, constructing, vending, selling, or using such invented boat or vessel shall forfeit and pay to the said James Rumsey, his executors, administrators, or assigns, the sum of five hundred pounds, current money, to be recovered in any court of record in an action of debt founded upon this act.

This act of Assembly was passed 22d January, 1785.

To the honorable the Representatives of the freemen of the State of Maryland in General Assembly met:

The petition of Oliver Evans, of the county of Newcastle and State of Delaware, respectfully sheweth: That, during the late war, your petitioner, at at a very considerable expense and labor, in various experiments for the purpose of framing a machine (perhaps entirely new) to make wool and cotton card teeth, was at length able to bring his very desirable invention to such perfection as to finish a machine which would feed itself, and completely make one thousand card teeth in one minute; as well as a machine for pricking the holes in the leather with great exactness and dispatch, for the purpose of fixing the card teeth in; and that other persons are now likely to receive equal emolument with himself, by making said machines from his pattern, selling them, and causing them to be used. Your petitioner further showeth that he is altogether convinced that he can erect, for the use of merchant mills, a machine to break the fly-eaten grains in the wheat, to break the lumps of dirt, shell the white caps, and bruise the garlic, so as to render all these things more easily and completely separated by means of the screw and fan; a machine to convey the meal, as fast as ground, from the stones to fall on the upper loft; a machine to attend the bolting hopper with regularity: all or either of which he conceives will very much lessen the labor, and consequently the expense of the milling business. But he, taking into view the expense and labor attending the inventing, contriving, and erecting the above mentioned machines, supposes it would much exceed any private emolument likely to be derived to himself, unless he had some exclusive right to make, vend, and cause to be used, said machines; therefore your petitioner prays your honors to grant him, his heirs and assigns, an exclusive right to make, vend, and cause to be used said mill machine, as well as the machine for making card teeth, that hath the singular property of feeding itself, for the term of twenty-five years, or such time as your honors may think proper. And your petitioner, as in duty bound, will ever pray.

(Signed) OLIVER EVANS.

Upon the said petition was thus endorsed, to wit:

By the Senate, February 16, 1786. Read, and referred to the consideration of the House of Delegates.

By order,

J. DORSEY, *Clerk.*

AN ACT to grant to Oliver Evans for a term of years the sole and exclusive right of making and selling within this State the machines herein described.

Whereas, Oliver Evans, of the county of Newcastle, in the State of Delaware, miller, hath represented to this General Assembly that he hath invented, discovered, and introduced into exercise two machines for the use of mer-

chant mills, one of which, denominated by the said Oliver Evans an elevator, is calculated, by its own motion, to hoist the wheat or grain from the lower floor, and the meal or flour from the stones of any mill to the upper floor or loft of such mill; the other denominated an hopper-boy, so constituted as to spread the meal over the floor of a mill to cool, gather it up again to the bolting hopper, and attend the same regularly, without the assistance of manual labor; also, one other machine denominated a steam carriage, so constructed as to move by the power of steam and the pressure of the atmosphere, for the purpose of conveying burdens without the aid of animal force. And as the said inventions of the said Oliver Evans will greatly tend to simplify and render cheap the manufacture of flour, which is one of the principal staples of this State, as also render the use of land carriages more convenient and less expensive—in order to make adequate compensation to the said Oliver Evans for his ingenuity, trouble, and expense in the said discoveries,

Be it enacted by the General Assembly of Maryland, That, from and after the passing of this act, the said Oliver Evans, his heirs and assigns, shall have the sole and exclusive right of making and selling within this State the said machines above described, agreeably to his new method of constructing and making the same, for and during the full space and term of fourteen years from thence next ensuing, and fully to be completed and ended.

And be it enacted, That if any person or persons shall make, sell or use, or cause to be made, sold or used, within this State any hopper-boy or elevator, upon the plan of the said Oliver Evans, or any steam carriage to be propelled by the power of steam, or the pressure of the atmosphere, constructed as the said hopper-boy, elevator, or steam carriage of the said Oliver Evans are, or in form, similitude, or likeness thereof, during the said term of fourteen years, without the consent of the said Oliver Evans, his certain attorney, heirs or assigns, first had and obtained in writing, he, she or they so offending shall forfeit and pay to the said Oliver Evans, his heirs or assigns, for every such machine so made, sold or used, or caused to be made, sold or used, respectively the sum of one hundred pounds, current money of Maryland, to be recovered with costs of suit, by action of debt, bill, plaint, or information, in any competent court of record in any county of this State, in which the offence shall be committed, wherein no essoin, protection, or wager of law, nor more than one imparlance shall be allowed; provided, always, that if on any action brought for the recovery of the said penalty, it shall be proved that the said Oliver was not the original inventor of the machines for the making, using and selling of which such action shall be brought—that the jury shall find their verdict for the defendant, and such defendant shall recover his costs. Provided that nothing in this act contained shall prevent any future general assembly of this State from abolishing this exclusive right granted to the said Oliver Evans by this act, upon their paying to him, his executors, administrators or assigns, the sum of five thousand pounds current money.

And be it enacted, That if any person or persons who shall be convicted of having made, sold or used, within this State, either of the aforesaid machines, without the consent of the said Oliver Evans, his heirs or assigns, in writing, shall afterwards, without such consent, make, sell or use such machine or machines again, he, she or they so offending, shall forfeit and pay to the said Oliver Evans, his heirs and assigns, the sum of one hundred and

fifty pounds, like money to be recovered in like manner as aforesaid, and so *toties quoties.*

The aforegoing act of assembly was passed 21st May, 1787.

To the honorable the General Assembly of the State of Maryland:

The petition of Robert Lemmon, of Baltimore county, most respectfully sheweth—

That your petitioner, deeply impressed with an idea of the necessity and utility of introducing more effectually the manufactures of wool and cotton into this State, and also of prosecuting the same at the smallest expense which the nature of them will admit, hath with much attention constructed two machines, the one for carding cotton or wool, and the other for spinning the same. That the carding machine with one hand shall turn off more carded cotton or wool in good rolls in one day than thirty hands can do in the usual way, and the spinning machine shall with one hand spin more than twelve in the usual way, in any given time.

That your petitioner has models of the machines ready for the inspection of your honors, and has no doubt they will give satisfaction upon examination.

Your petitioner has in contemplation, (and is confident he could execute it,) a system of machinery to be worked by water, by which one thousand threads might be spun at the same time, with very few attendant hands, which he conceives, if perfected, would be capitally useful to the State, and submits it to your honors as an object worthy the attention of the legislature.

Your petitioner prays your honors may pass a law granting him, his heirs and assigns, an exclusive right to the making and vending the aforesaid carding and spinning machines, within this State, for the term of twenty years, &c.

(Signed,) ROBERT LEMMON.

[Endorsed]—"Read 16th December, 1786."

An act granting Robert Lemmon the exclusive right of making and vending Carding and Spinning Machines.

Whereas, Robert Lemmon, of Baltimore county, by his petition to the General Assembly, hath set forth that he hath constructed two machines, the one for carding, the other for spinning cotton or wool, and praying an exclusive right to making and vending the same; and, whereas, this General Assembly wish to encourage useful inventions, as well as promote the manufacture of cotton and wool within this State—

Be it enacted by the General Assembly of Maryland, That the exclusive right, benefit and privilege of making, constructing and selling within this State, the said machines for carding and spinning cotton and wool, shall be and is hereby vested in the said Robert Lemmon, his heirs, executors, administrators and assigns, for and during the space of fourteen years from the end of this present session of Assembly.

And be it enacted, That if any person or persons, during the said term of fourteen years aforesaid, shall make, construct or sell within this State any such machine for carding cotton or wool, or for spinning them, or either of

them, without a license in writing, first had and obtained from the said Robert Lemmon, his executors, administrators or assigns, or shall purchase such machine or machines, as aforesaid, within the term aforesaid, made by any other person than the said Robert Lemmon, his executors, administrators or assigns, or by some person licensed by him or them for that purpose, such person so making, constructing or vending such machine or machines, or buying the same, or either of them, shall forfeit and pay to the said Robert Lemmon, his executors, administrators or assigns, the sum of fifty pounds current money, to be recovered in any court of record, in an action of debt, founded upon this act; provided always, that if on any action brought for the recovery of the said penalty, it shall be proved that the said Robert Lemmon was not the original inventor of the machine for the making, selling or purchasing of which such action shall be brought, that the jury shall find their verdict for the defendant, and such defendant shall recover his costs.

This act of Assembly was passed 20th January, 1787.

NEW HAMPSHIRE.

OFFICE OF SECRETARY OF STATE,
Concord, N. H. Dec. 1, 1849.

SIR:—Your circular letter of Nov. 8th, requesting copies of any documents on file in this office, relating to patents granted under colonial rule, or by the State previous to conceding that right to the general government, has been referred to this office.

To comply with the request, I have been under the necessity of examining all the acts passed by the province under colonial rule; and also the journals of the council, and council and assembly, (most of which have no indexes.) The result of this examination has satisfied me that no patent was ever granted to any one, for any invention, by the provincial government of New Hampshire.

I inclose copies of acts, passed by the legislature of this State, granting patents to certain individuals. I have not been able except in one instance, although I have made a careful and thorough examination of the files in this office, to find descriptions of the inventions.

The copies forwarded are those of *all* the *patents* ever granted by the government of this State.

I have the honor to be sir, your obedient servant,
THOMAS P. TREADWELL, *Sec'y of State.*

To Hon. THOMAS EWBANK,
Commissioner of Patents.

State of NEW HAMPSHIRE. } To the Honorable Senate and House of Representatives, convened at Portsmouth, in said State, the first Wednesday of February, 1786.

The petition of Benjamin Dearborn of Portsmouth aforesaid, printer, humbly sheweth, That as your petitioner has spent much time and money in a variety of inventions, which may be of public utility, he is desirous of enjoying some exclusive benefit from some of them.

Having been the sole inventor of a new constructed printing press, which has many conveniences and advantages, that the common kind has not; having also been the sole inventor of a new constructed balance or scales, which for cheapness and convenience exceeds anything of the kind heretofore used; and having written a collection of rules in arithmetic, in a concise intelligible manner, for the use of schools, entitled The Pupil's Guide; your petitioner presuming that the collected wisdom of the state will not disown inventions formed on the principles of usefulness and economy, but will give countenance and encouragement to the inventor, prays that an exclusive right of making, and selling said press and scales, and of printing and vending said Guide, with any additions and improvements he may make on either of them, may be secured to him and his heirs or assigns for the term of twenty-one years.

As the before mentioned inventions could not be designed and executed

without much laborious study, your petitioner presumes that the reasonableness of this request, will be manifest to your honors. Wherefore he humbly prays for an exclusive right to the privileges aforesaid, and that he may have leave to bring in a bill accordingly.

And your petitioner as in duty bound, will ever pray, &c.

BENJAMIN DEARBORN.

State of NEW HAMPSHIRE, Office of Secretary of State.

[L. S.] I do hereby certify, That the foregoing is a true copy of the original now on file in this office.

Given under my hand and the seal of the state, this 24th day of November, A. D. 1849. THOMAS P. TREADWELL, *Sec'y of State.*

State of NEW HAMPSHIRE. In the year of our Lord, one thousand, seven hundred and eighty-six.

[L. S.] *An Act investing Benjamin Dearborn with the exclusive right of making and selling certain articles therein specified.*

Whereas, Benjamin Dearborn of Portsmouth, in the county of Rockingham, and state aforesaid, printer, hath petitioned the General Court representing that he had spent much time and money in a variety of inventions, which might be of public utility. That he was desirous of enjoying some exclusive benefit from some of them; having been the sole inventor of a new constructed printing press, which has many conveniences that the common kind has not, and having written a collection of rules in arithmetic in a concise, intelligible manner for the use of schools, entitled, the Pupil's Guide, he prayed that the exclusive right of making and selling any such printing press, and of printing and vending said Pupil's Guide within this state, might be secured to him, his heirs and assigns for a certain time, with any improvements and additions he might make to any of them. The prayer of which petition after due enquiry had, appearing reasonable, therefore,

Be it enacted by the Senate and House of Representatives in General Court convened, That the said Benjamin Dearborn his heirs and assigns, be and hereby are entitled to the sole and exclusive right of making and selling any such printing presses, and of printing and vending of said Pupil's Guide, with any improvements or additions he may make to the same or any of them, for the term of fourteen years from the passing of this act. And if any person or persons but the said Benjamin Dearborn, his heirs or assigns, shall within the term aforesaid, make, sell or print any such printing press, or Pupil's Guide, without his or their permit therefor, such person or persons shall forfeit and pay to the said Benjamin Dearborn his heirs and assigns, double the value of the press, or Pupil's Guide, so made, sold or printed, for every such offence, to be recovered in any court of law proper to try the same.

State of NEW HAMPSHIRE. In the House of Representatives, June 14th, 1786.

The foregoing bill having been read a third time, voted that it pass to be enacted. Sent up for concurrence.

JOHN LANGDON, *Speaker.*

In Senate June 14th, 1786. This bill having been read a third time, voted that the same be enacted.

JOHN SULLIVAN, *President.*

State of NEW HAMPSHIRE, }
Office of Secretary of State. }

[L. S.] I do hereby certify, That the foregoing is a true copy of the original now in this office.

Given under my hand and the seal of the state, this 24th day of November, A. D. 1849. THOS. P. TREADWELL, *Sec'y of State.*

State of NEW HAMPSHIRE. } In the year of our Lord one thousand seven hundred and eighty-seven.

[L. S.] *An Act to vest in Benjamin Dearborn the exclusive right of making and vending certain engines and scales for fourteen years.*

Whereas, Benjamin Dearborn of Portsmouth, in the county of Rockingham, and State of New Hampshire, printer, hath petitioned the General Court setting forth, That he hath at much expense of time and money, invented and constructed a hand engine for throwing water, and that he hath also made and constructed a balance or scales on a new plan, wherefore he prayed that a patent right be granted to him, his heirs and assigns, for the exclusive right of making and vending said engines and scales, with any improvements he might make thereon. The prayer of said petition after a full hearing appeared reasonable; and it being for the interest of the state to encourage the inventing and constructing of new, more convenient and less expensive instruments for the different purposes of life:

Be it enacted by the Senate and House of Representatives in General Court convened, That the said Benjamin Dearborn, his heirs and assigns, be and hereby are vested with the exclusive right of making and vending scales, upon the construction by him, made and shewn to the court; and of making and vending his new constructed hand engine for throwing water, and other engines upon the same principles, with one or more barrels, and with or without condensed air or suction, with any improvements which he may make upon said scales, or engines, for the term of fourteen years, from and after the passing of this act. That the scales shall not exceed in price the sum of eight pounds, nor the hand engine with one barrel, the sum of six pounds in gold or silver, or equivalent in other articles.

And the more effectually to secure to the said Dearborn the right thus vested, no scales of the like construction, nor engine of any size, with one or more barrels upon the same principles with that shewn to the court, shall be used in this state for the term aforesaid, without a seal or stamp affixed or imprinted by the said Dearborn, his heirs or assigns on the same under the penalty and forfeiture of ten pounds

And if any person or persons shall counterfeit the said seal or stamp, or affix or imprint a counterfeit on said scales or engines, he or they shall forfeit and pay the sum of twenty pounds, and all and every other person but the said Benjamin Dearborn, his heirs and assigns, is hereby prohibited from making or vending within this State, for the term aforesaid, any part or parts of scales upon similar construction, and of engines upon the same principles with those before mentioned, under the same penalty or forfeiture; and whereas by an act of this State, passed in June, 1786, the exclusive right of making and vending new constructed printing presses was granted to the said Dearborn, his heirs and assigns, for the term of twenty-one years; the more effectually to carry the intent of said act into execution, be it enacted by the authority aforesaid, that the said new constructed printing presses which shall

be made after the passing of this act, within the time specified in the act passed as aforesaid, shall have a seal or stamp affixed or imprinted by the said Dearborn, his heirs or assigns, on the same; and if any person shall make use of said new constructed printing presses without seal or stamp as aforesaid, or shall counterfeit said seal or stamp within said term, he shall forfeit and pay the sum of ten pounds. The said forfeitures and penalties to be recovered by action of debt, in any court proper to try the same, by the said Dearborn, his heirs or assigns, to his or their use respectively.

And be it further enacted, That the said Dearborn, within one month from the passing this act, shall lodge in the secretary's office a model of each of the machines aforesaid, or a draught of each of them, with a full description of them, and the principles upon which they are constructed.

State of New Hampshire. } In the House of Representatives, January 12th, 1787.

The foregoing bill having been read a third time, voted that it pass to be enacted; sent up for concurrence.

JOHN SPARHAWK, *Speaker, P. T.*

In Senate, January 12th. This bill having been read a third time, voted that the same be enacted.

JOHN SULLIVAN, *President.*

State of New Hampshire, }
Office of Secretary of State. }

[L. S.] I do hereby certify, that the foregoing is a true copy of the original now in this office.

Given under my hand and the seal of the State, this 30th day of November, 1849. THOS. P. TREADWELL, *Sec'y of State.*

State of New Hampshire. } In the year of our Lord one thousand, seven hundred and eighty-eight.

An Act to grant to Oliver Evans for a term of years, the exclusive right of making and selling within this State, the machines herein described.

[L. S.] *Whereas*, Oliver Evans, of New Castle county, in the State of Delaware, miller, hath represented to this court that he hath invented, discovered and introduced into exercise, two machines for the use of flour mills, one of which denominated by the said Oliver Evans an elevator, is calculated by its own motion to hoist the wheat or grain from the lower floor, and the meal or flour from the stones of any mill, to the upper loft of such mill. The other, denominated an hopper-boy, so constructed as to spread the meal over the floor of a mill to cool, gather it up again to the bolting hopper, and attend the same regularly without the assistance of manual labor.

Also one other machine denominated by said Oliver Evans a steam carriage, so constructed as to be propelled or moved by the power of steam, and the pressure of the atmosphere, for the purpose of conveying burthens without the aid of animal force.

And as the said inventions of the said Oliver Evans will greatly tend to simplify and render cheap the manufacture of flour, as well as greatly lessen the expense of land carriage, in order to make compensation to the said Oliver Evans for his ingenuity, trouble and expense in the said discoveries:—

Be it enacted by the Senate and House of Representatives, in General Court convened, That from and after the passing of this act, the said Oliver Evans, his heirs and assigns, shall have the sole and exclusive right of making and selling within this State, all the three machines above described, agreeable to his new method of constructing and making the same, for and during the full space and term of fourteen years next ensuing, fully to be completed and ended.

And be it further enacted by the authority aforesaid, That if any person or persons shall make, sell or use, or cause to be made, sold or used, within this State, any elevator, hopper-boy, or any steam carriage to be propelled by the power of steam or the pressure of the atmosphere, upon the plan of said Oliver Evans, and constructed as the said elevator, hopper-boy or steam carriage of the said Oliver Evans are, or in form, similitude or likeness thereof, during the said term of fourteen years, without the consent of the said Oliver Evans, his certain attorney, heirs or assigns, first had and obtained in writing, he, she or they so offending, shall forfeit and pay to the said Oliver Evans, his heirs or assigns, for every such machine so made, sold or used, or caused to be made, sold or used, respectively the sum of one hundred pounds, lawful money of New Hampshire, to be recovered with costs of suit by action of debt, bill, 'plaint or information in any proper court to try the same:

Provided always, that nothing in this act contained, shall prevent any future General Court of this State from abolishing the exclusive right granted to the said Oliver Evans by this act, upon their paying to him, the said Oliver Evans, his executors, administrators or assigns, the sum of two thousand pounds in gold or silver money.

And be it enacted by the authority aforesaid, That if any person who shall be convicted of having made, sold or used within this State, either of the aforesaid machines, without the consent of the said Oliver Evans, his heirs or assigns in writing, shall afterwards without such consent, make, sell or use such machine or machines again, he, she or they so offending shall forfeit and pay to the said Oliver Evans, his heirs and assigns, the sum of one hundred and fifty pounds, like lawful money, to be recovered in manner aforesaid.

Provided nevertheless, that the said Oliver Evans shall within three years from the passing this act, cause some person well instructed in the art of constructing said machines, to reside constantly within this State, from and after said three years, until the expiration of said fourteen years.

In the House of Representatives, January 28th, 1789. The foregoing having been read a third time, voted that it pass to be enacted. Sent up for concurrence. THOMAS BARTLETT, *Speaker*.

In Senate, January 30th, 1789. This bill was read a third time. Voted that the same be *non-concurred*.

J. PEARSON, *Sec'y*.

State of NEW HAMPSHIRE, }
Office of Secretary of State. }

[L. S.] I do hereby certify, that the foregoing is a true copy of the original now in this office.

Given under my hand and the seal of the State, this 30th day of November, 1849. THOS. P. TREADWELL, *Sec'y of State*.

State of New Hampshire. } In the year of our Lord one thousand seven hundred and eighty-nine.

An act to grant to Oliver Evans for a term of years the exclusive right of making and selling within this State the machines herein described.

[L. S.]

Whereas, Oliver Evans, of New Castle county, in the State of Delaware, miller, hath represented to this court that he hath invented, discovered, and introduced into exercise two machines for the use of flour mills, one of which, denominated by said Oliver Evans an elevator, is calculated by its own motion to hoist the wheat or grain from the lower floor, and the meal or flour from the stones of any mill to the upper loft of such mill.

The other, denominated an hopper-boy, so constructed as to spread the meal over the floor of a mill to cool, gather it up again to the bolting hopper, and attend it regularly without the assistance of manual labor; and as the said inventions of the said Oliver Evans will greatly tend to simplify and render cheap the manufacture of flour, as well in order to make compensation to the said Oliver Evans for his ingenuity, trouble and expense in the said discoveries—

Be it enacted by the Senate and House of Representatives in General Court convened, That from and after the passing this act, the said Oliver Evans, his heirs and assigns, shall have the sole and exclusive right of making and selling within this State the machines above described, agreeable to his new method of constructing and making the same for and during the full space and term of seven years next ensuing, fully to be completed and ended.

And be it further enacted by the authority aforesaid, That if any person or persons shall make, sell or use, or cause to be made, sold or used, within this State, any elevator or hopper-boy upon the plan of the said Oliver Evans, and constructed as the said elevator or hopper-boy of the said Oliver Evans are, or in form, similitude, or likeness thereof, during the said term of seven years, without the consent of the said Oliver Evans, his certain attorney, heirs or assigns, first had and obtained in writing, he, she or they so offending, shall forfeit and pay to the said Oliver Evans, his heirs or assigns, for every such machine so made, sold or used, or cause to be made, sold or used, respectively the sum of one hundred pounds, lawful money of New Hampshire, to be recovered with costs of suit, in a proper court to try the same.

Provided always, that nothing in this act contained shall prevent any future General Court of this State from abolishing the exclusive right granted to the said Oliver Evans, upon their paying to him, the said Oliver Evans, his executors, administrators or assigns, the sum of two thousand pounds in gold or silver money.

And be it enacted by the authority aforesaid, That if any person who shall be convicted of having made, sold or used within this State, either of the aforesaid machines, without the consent of the said Oliver Evans, his heirs and assigns, in writing, shall afterwards, without such consent, make, sell or use such machine or machines again, he, she or they so offending shall forfeit and pay to the said Oliver Evans, his heirs and assigns, the sum of one hundred and fifty pounds, like lawful money to be recovered in manner aforesaid. Provided, nevertheless, that the said Oliver Evans shall, within one year from the passing this act, cause some person well instructed in the art of constructing said machines to reside constantly within this State, from and after the said one year, until the expiration of said seven years.

In Senate, February 3d, 1789. The foregoing bill having been read a third time, voted that it pass to be enacted—sent down for concurrence.

JOHN PICKERING, *President.*

In the House of Representatives, February 6th, 1789. The foregoing bill having been read a third time, voted that it be enacted.

THOMAS BARTLETT, *Speaker.*

State of NEW HAMPSHIRE, }
Office of Secretary of State. }

[L. S.] I do hereby certify, that the foregoing is a true copy of the original now in this office.

Given under my hand and the seal of the State, this 30th day of November, 1849.

THOMAS P. TREADWELL,
Secretary of State.

State of NEW HAMPSHIRE, }
Portsmouth, December 8th, 1791. }

The following is a description of an invention of John Young, in the art of building and altering chimneys, so as to render them morally certain of carrying smoke in tight rooms, which is humbly submitted to be lodged in the office of the Secretary of State by the author.

Let a tube be prepared of plated iron, tin, lead, or logs bored like a pump, or strips of boards will do—let the tube be three inches diameter at one end, or more, for a large smoke, and half that diameter at the other end—place said tube, for convenience, under the floors of the house, in any story thereof—let the largest end of said tube be placed at the outside of the house, so as to receive the air from abroad—let the other end be placed at the bottom of one of the jambs leading up through said jamb to the top thereof, a small distance within the mantel-piece, where the tube is to be let into the smoke of the chimney about six inches, pointing upwards—or the tube may be brought up the outside of any jamb, either in old or new chimneys, where it is convenient, and let through the jamb into the smoke of the chimney as aforesaid—and when it is most convenient one large tube may be fixed into any part of a house, so as that the end at the outside be at least as low as the other end, with small tubes leading therefrom to each or any fire-place in a chimney.

JOHN YOUNG.

State of New Hampshire, Rockingham, ss.

At Portsmouth, on the 8th day of December, 1791, the said John Young personally made oath that he is the original author and inventor of the within discovery and invention by him subscribed—and that he never knew or heard of any chimney or smoke of a chimney built or altered upon said plan before he had invented and improved thereupon.

Before, JOHN CALFE, *Just. Peace.*

State of NEW HAMPSHIRE, }
Office of Secretary of State. }

[L. S.] I do hereby certify, that the foregoing is a true copy of the original now in this office.

Given under my hand and the seal of the State this 30th day of November, 1849.

THOMAS P. TREADWELL,
Secretary of State.

VERMONT.

SECRETARY OF STATE'S OFFICE,
Montpelier, November 23, 1849.

Hon. THOMAS EWBANK, *Commissioner of Patents:*

SIR: Senator Upham, a few days ago, handed to me your circular relative to the history of American inventions, with a request that I would reply to it.

I have examined the records of this office, but can find no allusion of any kind to inventions or patents. Our early files and records are quite imperfect, and Mr. Henry Stevens, of Barnet, Vermont, an antiquarian, has been employed by this State for a number of years, in collecting papers connected with our early history.

And I take the liberty of suggesting the propriety of your addressing your circular to him. Mr. Stevens is now in Washington, acting for a short time, as I understand, under a commission from the Secretary of the Treasury.

With high respect, I am, &c.,

FERRAND F. SHERRILL,
Secretary of State of Vermont.

Young or any one of his said agents, he or they shall not be considered guilty of any oreach of this act.

And be it further enacted, That in case the said Young shall obtain a patent from the general government of the United States for the exclusive privilege of building and altering chimneys as aforesaid, and said patent shall extend to and operate in this State; on the receipt thereof by the said Young, his heirs or assigns, this act shall be void.

State of NEW HAMPSHIRE, } In the House of Representatives, Dec. 8th, 1791. The foregoing bill, having been read a third time, passed to be enacted.

Sent up for concurrence.

WILLIAM PLUMER, *Speaker.*

In Senate, December 12th, 1791.—This bill having been read a third time, voted that the same be enacted. JOSIAH BARTLETT, *President.*

State of NEW HAMPSHIRE, }
Office of Secretary of State. }

[L. S.] I do hereby certify, that the foregoing is a true copy of the original now in this office.

Given under my hand and the seal of the State, this 30th day of November, 1849. THOMAS. P TREADWELL,
Secretary of State.

VERMONT.

SECRETARY OF STATE'S OFFICE,
Montpelier, November 23, 1849.

Hon. THOMAS EWBANK, *Commissioner of Patents:*

SIR: Senator Upham, a few days ago, handed to me your circular relative to the history of American inventions, with a request that I would reply to it.

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And I take the liberty of suggesting the propriety of your addressing your circular to him. Mr. Stevens is now in Washington, acting for a short time, as I understand, under a commission from the Secretary of the Treasury.

With high respect, I am, &c.,
FERRAND F. SHERRILL,
Secretary of State of Vermont.

LOUISIANA.

NEW ORLEANS, *November 28th*, 1849.

SIR: I am instructed by the Governor, in answer to your letter of the 8th instant, to inform you that there are in the archives of this State no records of patents granted under colonial rule. Your communication will, however, be referred to Mr. De Bow, who has charge of our bureau of statistics, and who will transmit to you all the information he will be able to collect in connection with the objects mentioned in your letter.

Respectfully your obedient servant,

CHARLES GAYARRE,
Secretary of State.

THOMAS EWBANK, Esq.,
U. S. Patent Office Commissioner.

KENTUCKY.

Letter from Governor Crittenden.

FRANKFORT, December 2nd, 1849.

SIR: Your printed circular of the 8th of the last month, has been received, and although I can communicate nothing on the subject of your enquiries, I trouble you with this reply, to avoid the appearance of neglect or disregard of the national and laudable objects which you have in view.

The admission of Kentucky into the Union was subsequent to the adoption of the federal constitution, and no patents for discoveries or inventions were ever granted by her, nor do our records or public offices contain any information on the subject.

Very respectfully,

Yours, &c.,

J. J. CRITTENDEN.

THOMAS EWBANK, Esq.,

Commissioner, &c.

PENNSYLVANIA.

NORRISTOWN, December 14th, 1849.

JOHN FREEDLY, ESQ.,

DEAR SIR:—The letter from the Patent Office at Washington, addressed to the Governors of the different states, with its accompanying circular, as well as a letter from yourself, were duly received.

Upon looking over the documents and records to which I have access, I only find the following, viz:

"PHILADELPHIA, July 18th, 1717.

"To the Hon. William Keith, Esq., Lieut. Governor of Pennsylvania, and the three lower counties.

"The petition of Thomas Masters humbly sheweth, that at the humble representation of your petitioner's wife, Sybella Masters, his Majesty has been graciously pleased to grant him two several patents under the broad seal; one for the sole cleansing, curing and refining of Indian Corn growing in the plantations, fitter for shipping and transportation, in a manner not before found out or practised. The other for the sole working and weaving in a new method, palmeta, chip and straw for covering hats and bonnets, and other improvements of that ware, for the respective terms of fourteen years, in that part of the Kingdom of Great Britain, dominion of Wales, and town of Berwick upon Tweed, and the several plantations in America, as by the said letters patents (which he now lays before this honorable board) may more fully appear.

"Your petitioner prays leave to record the said patents in the province and territories, and such a favorable recommendation thereof from the board as may the more effectually answer his Majesty's most gracious intentions to him, and promote and forward such useful inventions and manufactures to the public, which he has at a vast expense set on foot and projected.

"And your petitioner shall ever pray, &c.

"THOMAS MASTERS

"The board having taken into consideration the said petition, [illegible] only to allow the said Thomas Masters to record the said patents, but not to publish t[illegible]

This [illegible]

[illegible]

GEORGIA.

WASHINGTON, December 5, 1849.

SIR:—I had the honor on yesterday to receive your letter of the 12th ult., and accompanying circular in relation to the desire of the Bureau over which you preside, to collect such interesting facts as may be hidden in the archives of Georgia.

All the facts that can be had will probably be communicated by the Governor of Georgia, who, you say, has been addressed also on the same subject, but with a view to elicit any that might not be in the Department of State, I will address some persons in my state, most likely to be acquainted with such matters. Residing in that part of Georgia which has been acquired of the Indians at a comparatively recent period in the history of our State, my immediate constituents are in all probability not in possession of anything worthy of being communicated to the Department.

I have the honor to be,

Your obedient servant,

A. F. OWEN.

Hon. THOMAS EWBANK,
Commissioner of Patents,
Washington D. C.

FLORIDA.

SECRETARY'S OFFICE,
TALLAHASSEE, January 4, 1850.

Hon. THOMAS EWBANK,
Commissioner of Patents:

SIR:—Your circular of 8th November ult. to his Excellency the Governor, has been handed to me for reply.

I have to state in answer thereto, that no documents relating to patents, &c., are on file in this office.

Allow me to suggest, that, should you address Circulars to the Officers of the Public Archives, in St. Augustine and Pensacola, you may obtain some information upon the subject.

Respectfully,
C. W. DOWNING,
Secretary of State.

ALABAMA.

EXECUTIVE DEPARTMENT,
MONTGOMERY, Ala., January 8th, 1850.

SIR:—I am in receipt of your printed letter of the 8th November, in which you "request to be furnished with copies of any such documents as may be on file in the State Department" of Alabama, which may aid you in tracing up the history of American inventions. I regret that the Archives of the State furnish no information such as you desire.

I have the honor to be,
With great respect, your obedient servant,
H. W. COLLIER.

Hon. THOMAS EWBANK,
Commissioner of Patents,
Washington City.

MICHIGAN.

LETTER FROM SENATOR FELCH.

WASHINGTON, January 12th, 1850.

SIR,—I took the liberty of sending one of your circulars, relative to early records of inventions, and to the history of inventions anterior to the establishment of our present form of government, to Governor Woodbridge, of Michigan, in hopes that his intimate knowledge of the French inhabitants of the North West Territory might furnish some interesting facts on the subject. Although nothing of the kind has been elicited, I am induced to send you the letter of Mr. W. in reply to my communication. No man has had better opportunities for knowledge on the subject than Governor Woodbridge.

I am, sir, very respectfully your obedient servant,

ALPHEUS FELCH.

Hon. Mr. EWBANK, Com'r of Patents.

SPRINGWELLS, near DETROIT,
December 27th, 1849.

Hon. A. FELCH:

Dear Sir,—I have received your note of the date of the 20th instant, with the Patent Office circular you did me the honor to send to me. I am sorry I cannot contribute to the fund of information which the Commissioner is taking measures to collect. When I first came to Michigan, (during the war of 1812,) the great body of its inhabitants consisted of the descendants of the old French colonists located here, with a sprinkling, more or less marked, of Indian blood. Of those of English parentage, either natives of the country, or long resident in it, and who, under Jay's Treaty, had elected to become American citizens, there were a very few families—and a few more, enterprising Yankees, who had from time to time, and more recently, wormed their way into these far-off and wilderness regions. But, as I have observed, the great body of the people were of Canadian parentage, and the features which characterized them were quite remarkable. A more honest and inoffensive people than they were, could not, I think, have been found upon the face of the globe; they were proverbially docile, friendly and hospitable. Possessing the social temper and national gayety of the French every where, they also retained in a most marked degree the manners and graceful polish of their ancestors. Cut off from all direct intercourse with Europe, from the time of their first establishment here, their associations with their countrymen abroad were principally with and through the army, which comprised, you know, since before the reign of Louis XIV., the best educated and the most polished of the people of France. This gave tone to their manners, habits and character, and which they did not forget, when, by the treaty of 1763,

they became almost entirely isolated. They had no market abroad for the products of the land; they, therefore, were not an agricultural people, properly speaking. It never entered into the policy of the French Government (and this was the great error of that Government) to make them so; and, except to the extent of their dealings in furs and peltries, they exhibited no proclivity for an active commerce. Their taste led them to rove in the boundless wilderness that surrounded them, and alternately to enjoy themselves upon the fruits of the chase at home. Their highest ambition was to *preserve* the remembrance and follow in the habits of *La belle France as La belle France was in the 16th century.* This was their *beau ideal* of social perfection! What would *such* a people have to do with *new inventions* or patented discoveries! The thought of *improving* in the mechanical arts, and especially upon the agricultural implements of their ancestors, never entered their minds. Happy, thrice happy, were those who could *preserve the remembrance of those that were!* You may well say, therefore, my dear sir, that you "have no knowledge of the existence of any patents in your part of the country granted under the French Government, or any record of early inventors" among them.

* * * * * * * * * * * * * * *

With much respect, your obedient servant,

WILLIAM WOODBRIDGE

VIII.

ON THE PROPULSION OF STEAMERS.

THIS division (Part I.) of the annual exposé, is assumed to be as suitable a medium for occasional essays on the great mechanical desiderata of the day, as is the section devoted to agriculture, for practical information to farmers. To suggest and stimulate invention, as well as protect it, would seem to come within the legitimate duties of a bureau, especially designed "to promote the progress of science and the useful arts." It is, therefore, proposed to occupy a few sheets in future with communications which may point out new channels of thought and tend to enlarge the area of invention.

The subjoined synopsis of original experiments, recently made by the undersigned, and illustrated by various types of nature's propellers, point out, as has been conceded, elements of marine progression that have hitherto been wholly overlooked by nautical engineers. The facts developed are respectfully submitted to Congress, as elucidations of a subject deserving the special attention of the General Government.

Oceanic steamers are too essential links of the system of cheap and free postage—domestic and international,—to be allowed to pursue undisturbed their present average passages. To this great and growing element of modern civilization, and of universal brotherhood, they have yet much to contribute. The Ferry-boats of Nations, they must make their runs from continent to continent, so as to rival, both in regularity and speed, the lines of land locomotives which they severally serve to connect.

The proposition may be a startling one, that in science, the further men advance, the longer become their strides, and the easier they are taken: yet so it is. Locomotive navigation is in point; but, surprisingly rapid as has been its growth, it is in its veriest infancy. Born in our day, its greatest feats are yet to be performed. By gallantly dashing through the palings which some savans had imprudently reared before them, Oceanic steamers have read the learned a lesson about laying out boundaries for science, and hedging in enclosures for art, which will not soon be forgotten.

It is with artificial, as with natural motive-mechanisms: an intimate relationship exists between the members; reaching to the minutest and remotest. If one be out of order, all feel the effect. A lame leg makes its owner halt; an inflamed finger, toe, or tooth, deranges more or less the whole body:—just so with a steamer, whose instruments of progression are defective in figure, out of place, or disproportionate: she too, limps, though neither the infirmity nor the seat of it may be suspected. Swift and agile she may seem to be, yet much of her power produces no corresponding result in her onward course. Like the injured or distorted wings of a bird, malformation in her *paddles is fatal to her* healthy and rapid flight.

Acute intellects have, for years, been employed in perfecting marine engines and boilers, but the true figure of propelling blades is a subject that has escaped general attention; sources of retardation were not imagined to be lurking there. The virtue of form in them has not been thought of; in short, while speed is desired above all other qualities, the least attention has been given to the organs upon which it depends. Steamers are now so elaborately improved and enriched, as to elicit and deserve the soubriquet of floating palaces; but their buckets are the same rude affairs as were used in primeval paddle-wheels. In endeavoring to quicken their pace, our efforts have resembled those of trainers of race-horses, who should confine their attentions to the animals' heads and trunks, instead of developing and strengthening the muscles of their limbs.

Experiments on the Paddles of Steamers; their figure, dip, thickness, material, and number, &c., made on the Harlem River, New York, in 1848.

For this purpose, the boat, Fig. 1, was employed. It was 12½ feet long, and 3½ feet across the middle. A wrought iron shaft, 1 inch square, with a crank, extended across the gunwales, and turned in bearings bolted to them. Each end of the shaft stretched 14 inches over the side of the boat, which prevented the wheels, that were secured on each extremity, from throwing as much water into the vessel as if they had been nearer; and afforded a better opportunity of observing the action of the blades. A person seated at one end of the boat, readily turned the wheels in either direction, by alternately pushing from and pulling towards him, two upright rods, which moved in joints at the bottom of the boat, and were connected to the cranks by horizontal rods or pitmen.

Fig. 1.

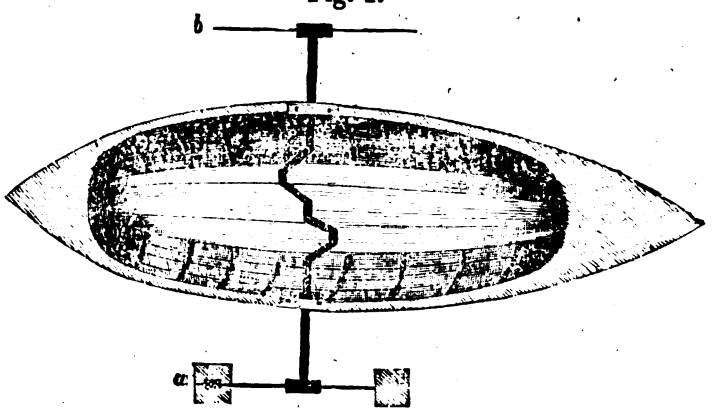
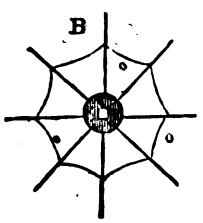


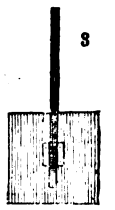
Fig. 2.



The wheels were very light, and of the simplest construction. One is figured at B. Eight slender arms, of $\frac{5}{16}$ square iron, with their inner ends cast in the central piece, extended 20 inches from the centre, and thus made a 40-inch wheel. To stiffen them, and transmit any strain upon one to the whole, they were braced tightly together by the wire, *o*, *o*, *o*, fig. 2, which was wound round each arm, and retained by slight notches at the corners. The various blades or paddles were cut out of stout sheet-iron. Square sockets, to slide over

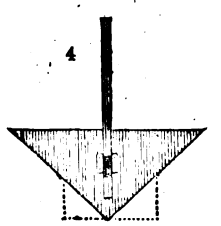
the arms, were rivetted to the paddles, by which means they were readily adjusted and secured at uniform distances from the axes. All were of the same area—49 inches.

To test the qualities of the boat, and get her into working trim, blades, 7 inches square, fig. 3, were fixed on the arms of both wheels, and several excursions up and down the river made with them. Their dip was 7 inches, or rather more, for their upper edges were half an inch below the surface. They were next removed from one wheel and left on the other, as the standard by which to compare the effects of different shaped ones. They were distinguished as No. 1. Nearly all the rest were formed from them: i. e., by removing portions from one part and adding them to others, as will be seen in the following diagrams. In this way there was no danger of making, through mistake, one set of blades of larger or of less superficial surface than others—since no calculation of their areas was required.



In all the figures, the paddles are supposed to sweep through the water in the position as represented, the lowest sides being those which descend lowest in the fluid.

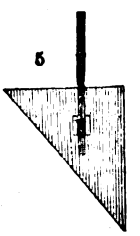
Fig. 4, formed by cutting off the lower angles of fig. 3, and transferring the pieces to the upper ones, making a right-angled triangle with sides 10 inches, and hypotenuse 14. (By mistake the upper corners were cut away, so as to leave the area of these blades 48 square inches instead of 49.) Eight of these were fixed on the wheel, (see *b*, fig. 1,) to compete with the same number of fig. 3, on *a*, both having 7¼ inches dip.

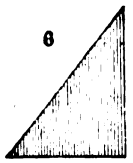


It will be obvious that, as both sets were attached to the same shaft, if one proved more efficient than the other, the boat would be turned from a straight course, and be inclined, more or less abruptly, to the weaker or less efficient set. The result was, that those marked fig. 3 overcame fig. 4, and though only in a small degree, yet quite sufficient to establish their superior effect on the vessel's progress. As we were not always out of the influence of tides and slight breezes, each experiment embraced excursions in various directions on the river. Once or twice the boat went straight as an arrow; but eventually the square paddles got the better of the triangular ones. These dipped into the water with little noise, and threw it off behind from their points.

Most of the experiments were made in smooth water, and except slight currents—aqueous and aerial—under the most favorable circumstances. Two persons occupied the boat, and the greatest care was exercised in preserving the shaft in a horizontal position. When results were doubtful, the experiments were repeated, and generally several times.

The same paddles (fig. 4) were next attached to the arms in the position represented in the margin, and distinguished as fig. 5, the upper side being, as in all other instances, 13 inches from the centre of the axis. Through repeated trials, they overcame the test paddles, fig. 3, and in a rather more marked manner than fig. 3 surpassed fig. 4. They entered the water silently, but observers on shore thought they raised more water behind, but did not raise it as high as fig. 3. Their points were nearly three inches lower in the water than the lower edges of fig. 3. The boat described a circle of four hundred feet, and another of six hundred.





The same blades were next tried as fig. 6. From the experiment fig. 5, it was inferable that, if inverted, the effect of the blade on the boat would be augmented, as a larger portion would have a longer sweep through the water. Such was the fact, and to such a degree that first two, and then four, were removed from the arms, when the remaining four were found equal to the eight of fig. 3. The plates were next raised till their lower edges were on a level with those of No. 1. In that position, two inches of their upper extremities were above the surface of the river; but notwithstanding, they had a decided advantage even then over the square ones.

Lastly, the same blades were turned into the position of fig. 7, being fig. 4 reversed. The boat was turned on No. 3 under all circumstances, describing circles from 80 to 150 feet in diameter. Four of them equalled eight of No. 3. They were thought to throw off more water behind than their competitors, which, from the greater extent of their extremities, was probably true.

The next form tried was fig. 3 placed in the position of fig. 8. These turned the boat round against the test ones, in circles varying from 50 to 200 feet. We then tried six of them against the other eight, when there was little observable difference in the result. Four were found superior, but three were unequal to them. These of course entered the water without jarring, and threw it off at their points. Mr. B. thought they threw up more than fig. 3.

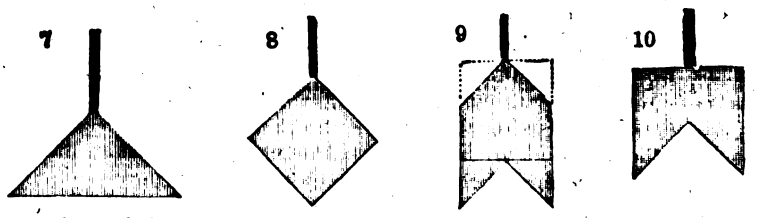


Fig. 9, formed by removing the upper corners below, as in the figure, seemed to have the advantage of fig. 8; but as light winds troubled us, we felt some hesitation in pronouncing them better. Four were superior to eight of No. 3. It was supposed that a slight accession of resistance to the lower ends, sweeping through the water, might be derived from opposing currents meeting in the forks, but we had no means to ascertain if it existed.

Fig. 10, cut out of plates eight inches square, with one-fourth (minus a superficial inch) removed, as shown in the figure. After several excursions, these were thought to exhibit a very slight advantage over fig. 3; but from subsequent tests, they seemed to be balanced. We, on another day, reversed them, as

Fig. 11, which had a decided preponderance over their competitors. Six predominated slightly over the latter, and four were thought nearly equal to them. There was a difference of opinion on the last point—some thinking they were quite as effective as the opposing eight.

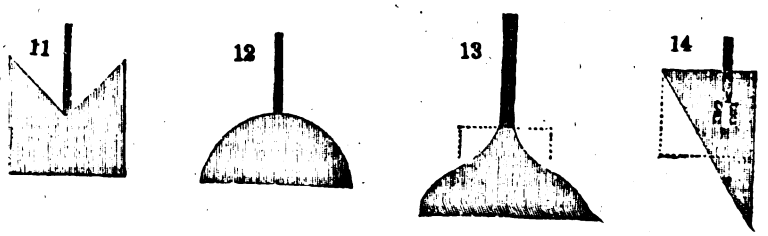
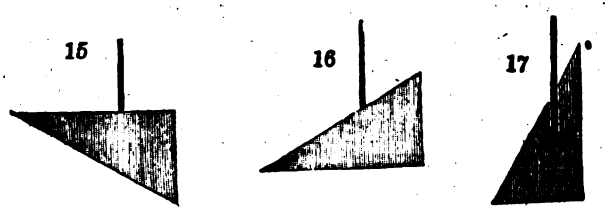


Fig 12 was a semicircle. Mr. B. undertook to test these. They turned the boat in circles varying (from light winds and tides) from 30 to 150 feet. Four were thought sometimes equal, and sometimes superior, to eight of fig. 3. It is demonstrable that these blades are less effective, though in a very small degree, than those marked fig. 7, and, when reversed, more powerful than fig. 4.

Fig. 13, formed as represented, but not tried, as it was evident their value would be nearly that of fig. 7, probably a shade above them, but too minute to be detected, except in perfectly still water.

Fig. 14, a right-angled triangle, 7 inches across the top, and ending in a point nearly 14 inches below it. These were, as might have been anticipated, more effective than those of fig. 3. "Everything about them," observed Mr. B., "shows their superiority." They, of course, entered the water without jarring.

The same were attached to the arms in the position of fig. 15, and were unable to compete with fig. 3. The latter had a slight advantage over them.



They were next reversed, as fig. 16, when they proved effective as figs. 7 and 12—four being equally so as the eight opposed to them.

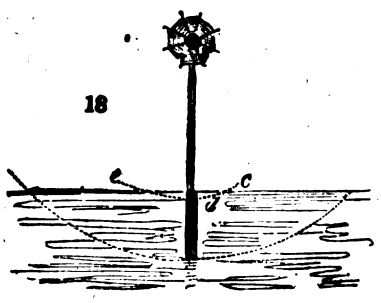
They were finally changed to fig. 17, when the boat was turned so rapidly, as to make it difficult, with a wide oar, to keep her in one direction. Four were removed, and then she described a circle in less than 50 feet. Two more were taken away, leaving only a couple to act against the eight on the other wheel, and to which they proved equal.

From these experiments, it appears that, with equal *areas*, and equal *dip*, triangular blades may be rendered *twice* as effective as ordinary rectangular ones. This is made manifest by figs. 7, 12, and 16,—*four* of the former equalling eight of the latter. And this, too, while the propelling surface of the smaller number was only half that of the greater; for the four were as long in making a revolution, as were the eight. Hence, the speed of a boat may be increased by diminishing the number of her paddles—a fact still further elucidated by fig. 17.

There can, I think, be little doubt, that the greater the velocity of a steamer's wheels, the fewer (within certain limits) should be the blades; and that, at the rate at which some revolve, the number might be reduced with advantage. Some have three, others four, and in more than one vessel, without any load on board, I have seen six submerged at each wheel. In these cases, is it not evident that each blade, on entering, plunges, not, as it ought, into water undisturbed, but into that which preceding ones have already broken up, and set in motion towards the stern? It would seem that one in the act of plunging, another sweeping under the shaft, and a third leaving the surface, are all that are necessary to be kept up; and that a greater number, as regards the speed of a boat, is positively injurious. Yet, under a vague idea of attaining a higher speed, the number of paddles has frequently been nearly doubled.

Snow, as every person knows, causes the wheels of land locomotives to slip upon, instead of rolling over, the rail. They revolve as usual, but the carriages make little progress; hence much of the power spent on them is expended to no purpose. So it is with paddle-wheels: a boat never progresses in the ratio of their revolutions, because of the yielding medium in which, and against which, they act. They slip always—a result, to some extent, inevitable when massive solids wade through fluids. The distance between the Atlantic steamers' docks, in Liverpool and New York, has been calculated at 3023 miles, but their paddles, in each trip, pass over a space varying from 5000 to 8000 miles*. In steamers unaided by sails, the disproportion is often greater. Now can this be modified, by giving the paddles a better hold on the fluid they sweep through? The experiments with blades 5, 6, 7, 8, 9, 11, 12, 14, 16, and 17, furnish replies to the interrogatory.

The moral of the foregoing experiments is this:—As the propelling power of a paddle is greatest at its lower or outer extremity, and diminishes to nothing at the surface, so its face should enlarge with the dip, and be nothing, or next to nothing, above.—Let *d*, fig. 18, represent the end of an ordinary blade, or paddle. Its upper part barely touches the water, and only for the moment it is in the position shown. But suppose it were immersed to the line *c*, *c*,—say four or five inches—it would even then be no sooner under, than above the surface again, so brief would be its immersion. The lower edge, in the meanwhile, would sweep along the extended curve there delineated.



Of what use, then, to make the upper part of a blade of equal extent with the lower? Why accumulate surface where it is of little avail, and withhold it where it is most wanted?—expending materials and power without any adequate return, if not at an absolute loss. The quantity of water carried over a wheel, is certainly greater by ordinary, than it would be by triangular paddles. The popular form and position of paddles are unphilosophical, if viewed simply as propellers. Embrace the same area in any other outline—in a circle, ellipse, square, pentagon, hexagon, octagon, or other polygonous figure, and the propelling properties would be increased, and the jar arising from their striking the water, also diminished.

If the long parallelogram be preferred because of the ready application of wooden planks, then is the principal sacrificed to an accessory—the greater to the less. If triangular, or other improved blades, require the adoption of

* The English steamer *Europa* came in on the 25th ult., after the remarkably short trip of eleven days. Her wheels are 32 feet in diameter, and taking their revolutions at the average of 17 per minute, her paddles swept over a space exceeding 5000 miles. The steam ship *Northerner* has wheels 31 feet in diameter. In running from New York to Charleston, 630 miles, they made 52,000 revolutions, in another trip, 51,000. The *Cherokee's* wheels are the same dimensions. In her first trip, to Savannah, a distance of 700 miles, they made, 53,000 revolutions. The practice now is, to lessen the slip of marine carriage wheels, and make them approach nearer in effect to those used on land, by increasing their width; that is, the length of their paddles. Hence those of the *Atlantic*, one of the large Liverpool Liners now building, are to be 12½ feet long; but for the difficulty of entering the English docks, they would have been 14 feet. Those of the *Hermann* and *Washington*, of the Bremen Line, are respectively 8 feet and 7½; while the *Franklin*, preparing for the same line, has them 12 feet. The English mail boats of recent build, the Europa and her three associates, have paddles between 8 and 9 feet.

plates of metal, would it be wise to reject them on that account? But of this by and by. We shall see that thick wooden blades ought to be condemned on account of defects inherent in them.

But what is this expansion of the lower part of a paddle, and contraction above, but Nature's own plan? In the tails and fins of fishes, in wings of birds and insects, and especially in the palmipeds, she has nowhere sanctioned a rectangular propeller. All are inclined to equilateral, scalenous, or isosceletic triangles, or are made up of them. Nor does she ever unite the levers that work them to their sides. The junction is invariably at an angle, and the reason is apparent—that the largest surface may have the longest sweep.

With this view, the bodies of fishes taper down to meet the blades; retaining only sufficient muscle to work them. Waiting one day for the cars to proceed to Harlem, I stepped into a neighboring Fish Market, and sketched the following, from specimens on one of the stalls. I am ashamed to ac-

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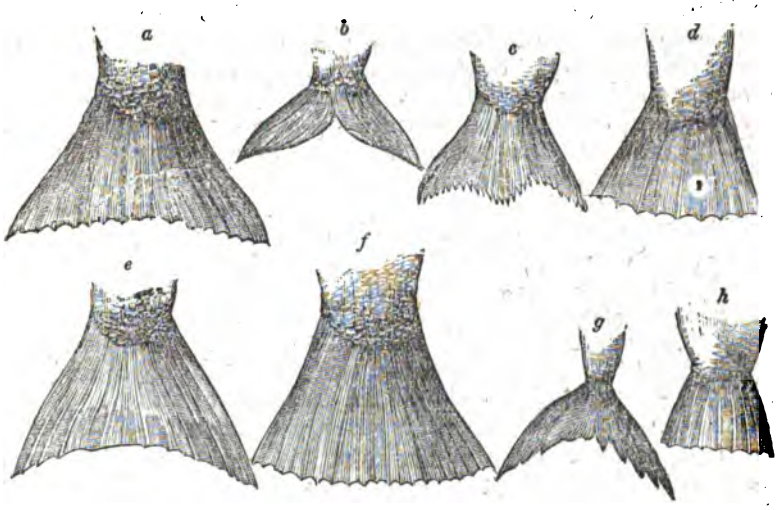


a, Striped bass,
b, Porgee,
c, Sea bass,
d, Black-fish,
e, Salmon,
f, Cod,
g, Mackerel,
h, Flounder.

knowledge that, till then, I was ignorant of the exact forms of these natural propellers, although most of them had passed under my observation on a thousand occasions. Too many of us spend no more thought on the infinitely curious and instructive mechanisms submitted by the Creator to our inspection daily, than does the ox on the vegetable glories he feeds on. The sentiment applies not more to religious than to physical truths. "Light shineth in darkness, and the darkness comprehendeth it not." We grope, as if blind, for that which is patent before us.

The general outlines and proportions are given in the preceding figures; the dimensions, of course, vary with the age and growth of individuals. The figures denote the width and length of the expanded tails—the latter being taken from the termination of the body, as shown by the curves, which

reach more or less into the tails—i. e. to strengthen them where strength is most required.

I confess I had no idea of meeting with figures so closely allied to the artificial ones which I had found most effectual as propellers. With the exception of the first two, the whole approach to equilateral triangles.

In the absence of a more extended acquaintance with the minuter aqueous and sub-aqueous organisms, the nearest of natural analogues to steam vessels, seem to be the principal swimming birds. These glide through two elements at once. Their long and heavy bodies, adapted to float gracefully on water, are provided with organs of propulsion, placed far behind their common centres of gravity—the cause that makes them such awkward travellers on land. When a gale blows in the direction they wish to pursue, like human navigators, they take advantage of it—they spread their wings to catch it, and are driven onward then, as steamers are, by both wind and paddles.

The reciprocating action, and the expanding and collapsing features of their aqueous organs of progression, are supposed to be unsuited to the magnitude, materials and velocity of artificial ones. Perhaps they are—but may not their contour be perfectly applicable—since, when open, and in action, the circumstances of the two bodies propelled—the bird and the boat—are not essentially dissimilar? Now, there is a marked adherence to the triangular form in the webbed feet of birds, showing that, in the judgment of the Creator, such an outline is the best for the purposes of their propulsion. Nor does it appear that this outline has, in any material way, been modified to meet other exigences. In the feet of water-fowl it is almost identical with the tail of the sea-bass. The legs or rods that wield these ornithological paddles are invariably united to them at their points or angles, and clearly for the reason already stated.

20

Fig. 20 represents the foot of a petrel. It is a type of all the swimming birds' propellers. Few, except professional naturalists, could distinguish between it and the same organ in geese, ducks, gulls, swans, the albatross, cormorant, diver, flamingo, &c., &c. Although natural paddles are submerged when at work, and those of our wheels emerge into air, to repeat their strokes, I doubt if a more efficient form could be given to the latter than the above. The cuspated extremity would obviate the jar consequent on straight-edged blades striking the water.

If I had a new boat to fit propellers to, they should resemble figs. 7, 6, or 17; or I would rather make them like half the foot of a swimming bird, as fig. 21—the perpendicular sides being next the vessel, that the greatest strain might be nearest to the power. Such blades would not be raised out of the sea by a vessel's rolling—nor, when submerged, be subject to excessive strainings, as common ones are. They would produce no concussion, or but little, on dipping, and would be twice as effective as the same area employed in the prevailing form and fashion.

21

If the principle were required to be adopted in the present paddles, it could be done at a trifling cost. I would remove portions from the upper sides, and attach them below, somewhat after the manner shown at figs. 22, 23, 24 and 25.

22

23

24

25

The portions *might* be removed by curved instead of straight lines.

If I should use blades similar to fig. 7, I would vandyke their lower edges, as at 23, point them as at 25, or fork them as at 22.

The foregoing experiments and remarks relate chiefly to the *figure* and *dip* of paddles. Other traits next solicited investigation; and though neither prominent nor promising any adequate reward for the requisite labor, they were thought worth attending to, since engineers will certainly be urged shortly to cast about for every means of adding, though ever so little, to the speed of steamers.

BUOYANT OR DISPLACING PADDLES.

It had been imagined, that the resistance which fluids oppose to the sinking of bulky bodies in them, might be employed as an element of propulsion—that if close barrels, for example, were fastened to the arms of a wheel, their ends would act as paddles, and the force required to plunge them, (equal to 62 pounds for each cubic foot of water displaced,) also react favorably on the boat. To test this idea, eight square and tight boxes, fig. 26, 7 inches by 7, and six inches deep, were secured to the arms of one wheel, and set to work against the eight blades, No. 1, (fig. 3,) on the other. The boxes required, very sensibly, more power to carry them round than any other tried, and were miserably deficient in pushing the vessel forward with it—certainly not equalling four of the competing blades. They produced quite a commotion in the water, carried large quantities over with them, and, could we have communicated sufficient velocity, would probably have formed a vertical ring of water. These boxes were and should be considered simply as unusually *thick* blades. All paddles are buoyant in proportion to their thickness.

Fig. 26.

THICKNESS OF PADDLES.

But though worthless in one respect, they were valuable in another, for they led us to the fact, or the law, that the propelling virtue of blades expands and contracts with their thickness. Thicken them till they touch each other, and they form a perfect drum, which could exert no more propelling power than a revolving grindstone;—reduce them to the thinnest plates, consistent with the strains they have to oppose, and in the same ratio their propulsive quality is augmented.

The boxes were removed, and boards $\frac{1}{4}$ths of an inch thick, and 7 inches square, put in their places. These represented common plank paddles, and were found sensibly inferior to their metalline competitors, whose thickness was slightly less than $\frac{1}{16}$ inch. We next took away two of the latter, when no very obvious change in the boat's direction occurred. When two more were taken off, the remaining four were unable to contend with the wooden ones. These, it will be remembered, were $\frac{1}{4}$th the thickness of the boxes, and consequently inherited that proportion of their defects.

It was also very observable how much more water was raised by the boards than by the plates. It could not easily be cast off their blunt boundaries, but kept running over them, from one side to another—a fact rendered more distinct in the boxes. Nothing could declare plainer, that the sharper the dipping edges of paddles are made, the more back water they throw off at the point where its departure is most beneficial: that is, when the re-action favors the vessel's progress—and, consequently, less is carried higher than the axis. A very little labor would impart this feature—in other words, would make their section a wedge. The resulting benefit would repay the expenditure a hundred fold.

Compared to metal, wood approaches in its nature to sponge; water clings to it; its pores are absorbing vessels, that suck it in, and assist to retain it on the surface.

Here nature also confirms the positions arrived at. Extreme tenuity of blade is stamped with perfection by her. Hence we see it strengthened by reticulated bars in the wings of insects—by radial, angular, and tapering ribs in the fins and tails of fishes. An uniformly thick, and unsupported slab, like our paddles, is nowhere met with. We cannot imagine natatory or soaring organs, formed after such a pattern, without feeling the absurdity.

The caudal propellers of fishes are necessarily thick where they join the bodies, but how rapidly is the substance diminished, and to a mere film, at their extremities, so much so, that they are often there torn and jagged, by accident or wear, as fishermen well know. There must, therefore, be some powerful reason for withholding the material—one that overbalances all inconveniences resulting from its absence; and what can it be but the thinner the blade, the more efficient as a propeller it is—the longer is its stroke, and the more effectual is the power that wields it. The same law prevails in the wings of birds; their outward boundaries are feathered off to almost nothing.

The reflection is irresistible. With what nicety and care Nature perfects her propellers, and how clumsy and unfinished are ours; as if, forsooth, a vessel's progress did not depend upon them.

The last two experiments demonstrate, that the less water a paddle *displaces* by its volume, the more efficient it is; that all accumulation of material behind its acting face, beyond what is absolutely necessary to strengthen it, is injurious, and ought to be avoided. But how does this accord with the current practice? Oaken planks are universally employed, and I have heard more than one engineer assert, that the thicker they are, the better! Because, said they, if the propelling property be not enhanced, it is not diminished, and the additional weight is a positive advantage, since the heavier the wheels are, the easier they work—the more uniform their movements.*

* As a further indication that the value of thinness in blades, and of their disencumbrance from every pound of material extraneous to their functions as propellers, has not hitherto been appreciated, it may be remarked, that the same language was repeated in my hearing, thus:—

The "Gorgon," an English steamer, had "large wheels and little power," so she used oak or pine scantlings, 5 inches by 6, or 6 by 8, for paddles. Had her managers been aware of the true effect of thick blades, they never would have adopted them with the view of economizing power.

Paddle planks vary in thickness from 1¼ to 3 inches. No sea steamers have them less than 2 inches. In the English vessels they are 2½; in others, as the *Franklin*, they are 2¼; in some of the largest class they are 3. The *Atlantic* and the *Pacific*, each of 3000 tons, now building for the Collins' Line, are to have them 3 inches. The former is to have 28 blades; hence, united, they will form a solid mass, *seven feet* thick, in each wheel—just one fifth of its diameter! They are to be 12½ feet long, by 34 inches; those of both wheels will, therefore, contain nearly 500 cubic feet of timber, and must displace that enormous volume of water at every revolution, by their submersion alone!—and, as we have seen, not only uselessly, but with a serious retardation of the vessel's headway, and waste of her motive power.

The wheels of the *Pacific* are to be 36 feet in diameter; each will have 30 blades, 11½ feet by 3 feet; the solid contents of her paddles will, therefore, equal 517 cubic feet. Her loss from the same source will, therefore, be greater. In *every* revolution of each of her wheels, her paddles will lose 7½ feet of effective stroke, and those of the *Atlantic* 7 feet. Those of the ocean steamer *United States* are 2¼ or 2½ inches thick; they are 36 in number, but as they are "split," and attached on both sides of the arms, there are really 72. The effective stroke of her blades is certainly diminished from 10 to 15 feet, in every turn of each of her wheels, startling as the assertion is.

Has the attention of engineers ever been turned this way? Or have they forgotten that a volume of water equal to that of a boat's paddles, and every inch of material submerged with them, is neutralized as a resisting medium, as often as it is displaced by their immersion—that water is to them what steam is to pistons—the more space the latter occupy in cylinders, the shorter becomes their stroke, because metal then takes the place of steam; the object to be moved crowds out the mover. Thicken a piston till it fills its cylinder, and the motive agent being wholly kept out, all motion ceases.

It is much the same with the paddles of a wheel. Let them fill up $\frac{1}{10}$, $\frac{1}{8}$, $\frac{1}{4}$ or $\frac{1}{3}$, of the circle they describe, and in those proportions they lose their virtue, because in the same proportion they displace or push aside the fluid agent on which their worth depends.

The *Atlantic* will lose *seven feet* stroke in every turn of her wheels. I leave to mathematicians to determine how many more miles an hour she would make if the loss were reduced to seven inches, by using ¼ inch iron in place of 3 inch plank.

The paddles of United States large steamers are invariably of 3 inch plank. The language of the chief engineer on this point, under date of January, 1849, was as follows: "The blades of large wheels for marine steamers are usually, and ought to be, three inches thick." The average number in each wheel, he observed, is twenty-eight. Hence, it is demonstrable that nearly twelve per cent. of the power employed in these vessels is thrown away, and

"A few tons of wood in the buckets do no harm, if they do no good; they add weight to the wheel, which is desirable, and their only disadvantage is, the additional load on the boat." I believe this is the general, if not the universal, opinion of engineers. But the experiments just referred to, teach us that, if a wheel require loading, the load should be attached to those parts of the arms that revolve above the surface. They cannot enter the water without becoming drags on the blades.

with it even a larger proportion of their enormous cost and attendance when in active service.

There are several interesting questions about paddles that yet require solutions, but as respects their thickness, there is no *mean* to seek; the thinnest is the best under all circumstances—thin, were it possible, as a lamina of mica. The only question is, what material will supply the thinnest sheets to resist the pressure they are to oppose? Plates of steel may yet be adopted, and perhaps coated by the electrotype process with copper or other metal.

To one remark, an examination of some steamers' wheels adds force. The accumulation of bolts, nuts, clamps, straps, stays, and other things, on and about the backs and faces of the paddles—sometimes even to bolting a new plank, or part of one, over an old one—shows that those who heap on matters of the kind, are not aware how much the efficacy of blades is thereby diminished. They forget that they should be thin and smooth as plates of glass, and that every inch of matter introduced between them is an evil. It is impossible to view the disjointed, broken, patched up slabs of some vessels, without exclaiming, "What a saving of power, and increase of useful effect, would not the substitution of a suitable sheet of metal for each accomplish!"

In some vessels—the United States mail steamer *Galveston* is one—strips of plank are bolted over the ends of the paddles to prevent their splitting or warping. As they do not diminish the faces, but merely form elevations upon them, they are doubtless considered as in no degree interfering with the propelling function. We now perceive that, when such things are necessary, they should be of iron, and let into the blades, so as to be flush with their surfaces.

A new division of engineering might judiciously be made, and paddle making be recognized as a distinct department. These instruments have certainly never received the attention which they merit. Speed is the great desideratum, and it depends on them. Engines, and all the mechanism of a steamer, are subservient to them; and yet, while everything else has been elaborated to the utmost, they have been all but overlooked.

NUMBER OF PADDLES.

The experiments of each day evinced that, so far as propulsion is concerned, the fewer the paddles the faster went the boat, so long as *one* at each wheel, or an area equal to the face of one, was kept in full play. A greater number in the water merely cuts it into slices, throws them into commotion, and diminishes the resistance they should oppose to the blades. As a further elucidation of this fact, four blades, 7 × 14, were tried against the eight test ones, 7 × 7. The smaller number had a decided advantage over the greater, and the cause was visible—they had a full sweep through an unbroken, undisturbed mass of fluid, and consequently produced, unabridged, their legitimate effects; while those on the other wheel—unusually small ($\frac{1}{3}$ or $\frac{1}{4}$) as their number was, compared to those on the wheels of steamers—following so quickly in the wake of one another, threw it into an uproar, causing eddies, whirlpools, and counter currents, and thus interfering with each other, necessarily produced inferior results.

We thought 8 of fig. 4 would be equally valuable as 2A of fig. 3, but the

construction of our wheels prevented us from instituting a series of similar comparisons.

The number of paddles now employed is, generally, greater than formerly. For large vessels, 28 are usual; some have 24, and others 32. The English rule, said to be a good one, is adhered to by many American engineers, except when circumstances require a deviation. By it, there is a paddle for every foot of a wheel's diameter, which makes them stand three feet apart; there are boats in which they occur every two feet.

One object of their multiplication, is to equalize the jar of their striking the water, by increasing the number of the blows. With the same view, they are often divided through the middle, lengthwise, and the inner half—that next the shaft—removed to the opposite side of the arm, as in the end view, fig. 27, thus *doubling*, in a manner, their number. All the British steamers have their blades thus arranged. The *Hermann's* 28 were thus made into 56; their efficacy was found to be reduced about 9 per cent. The value of the upper or inner halves has been ascertained to amount to about the same, for, when wholly removed, the lower portions have proved within 10 per cent. as effective as before. The blades of the *United States* are split, and disposed as in the figure. The true principle of breaking the jar of paddles striking the water, seems to me to be indicated in the blades 4, 5, 8, 9, 10, 14, 15, 21, 22, 23, 24, 25. Had the attention of engineers been led to it in the early days of steaming, the popular plan of avoiding the evil at the expense of a greater, would not have been sanctioned so long.

27.

I observed the blades of the last named steamer, a week after her recent return from Europe. *Seven* were submerged, or *fourteen*, if those on both sides of the arms be counted. She sailed on the 4th inst., for New Orleans, with eight (or sixteen) under water. The *Cherokee* left on the 1st for Savannah, with *six* of her undivided blades below the surface. The *Washington* came in on the 6th inst., from Bremen, with *five* similar ones fully immersed on each side—four full ones, and the halves of two others. The largest of our Sound and River boats have equal, if not greater numbers under. The *Vanderbilt*, 1200 tons, has *five*, or *ten* halves, immersed in each wheel, when lying at her dock, and without passengers on board. The *Isaac Newton*, 1200 tons, has similar wheels, and the same number of blades under water at once.

It is clearly as impossible for a paddle to do its duty, when thus embarrassed among its fellows, as for a traveller to make the same progress through a crowd, as on an open plain.

It may be a matter of future interest to place on record this feature, as exemplified in other New York steamers. The following memoranda are from personal observations, made within the last twelve months.

The *Hudson* has three undivided paddles under at each wheel.
" *Utica* three do. do. do.
" *Red Jacket* four do. do. do.
" *Cleopatra* four do. do. do.
" *Ansonia* nearly four do. do. do.
" *Fulcon*, U. S. mail, has five fully down.
" *Galveston*, U. S. mail, do. do.
" *Confidence* four and a half do.
" *Oswego* four do.

The *Koskiusko* three and a half—her arms heavy timber.
" *Erie* four do. do.
" *Armenia* four fully down—out of sight.
" *Antelope* three and a half do. do.
" *William Young* three do. do.
" *Buena Vista* two and a half do. do.
" *Admiral* nearly four do. do.
" *Warren* the same do. do.
" *New Haven* five do. do.
" *Hero* three do. do.
" *Massachussetts*, (1000 tons,) plying on the Sound—five.
" *Alida* three and a half. She is deemed a first class boat, and a quick goer. Her wheels are 31½ feet diameter. The blades, 2 inch plank, ten feet long by 33 inches; each consists of two planks 16½ inches wide—hence a joint in the middle. A curious example of the mechanical effect of the blades striking the water is exhibited; a long elliptical portion being worn away in several, as in the figure. Probably imperfect joints admitted the water through them at first, and continued rushing kept enlarging the apertures.

28.

The *Bay State* (1600 tons, plies on the Sound) has the same number of split and divided blades as the Newton and Vanderbilt, that is, ten immersed at each weel.

The *South America* has eight immersed at each wheel.
" *Buffalo* nine do. do
" *Empire State* eight—her arms and rings are heavy timber.
" *Oregon* ten—same as the Bay State.
" *Empire*, of Troy, eight—fully down.

As regards the violent concussion arising from the action of existing paddles, to diminish which their number is increased—to lessen by division the blows—there is a simple mode of reducing it *one half*, though from their unphilosophical and unmechanical figure, it cannot be wholly removed, nor the consequent loss of power avoided. The usual practice is, so to arrange a boat's wheels that two blades, one on each side, strike the water simultaneously. In calm weather who has not heard these double blows at the distance of several miles?—this custom is the converse of Nature's. No swimming or diving bird pushes out both paddles at once—they invariably *alternate* them; an imposing and instructive fact. Had any of the palmipeds, those especially that live entirely in water, hunting their prey beneath it, and consequently to whom velocity is indispensable to existence, struck out both paddles at once, the plan of nautical engineers might have been deemed in accordance with correct principles of speed, and economy of material and power; but while they all use but one at a time, it is surely worth while to test by experiments the difference between the two actions.

As sea steamers have little occasion to go sternforward, the backs of the acting faces are occasionally dressed off, as shown by the outline of fig. 29. As far as the lower or dipping parts are concerned, this is a small, a minute advantage; but from the preceding experiments, it is seen how beneficially such blades would act were those parts brought to a knife-edge, and their sections bounded by the dark part of the cut. Their sides might be made slightly concave, as nature's generally are. Such might be made also of metal, by uniting two curved plates at the

29

lower edges, and letting them diverge upwards; braces, if necessary, might be introduced between them. Each plate would, however, be a brace to the other.

ARMS OF WHEELS.

The practice of making the arms of paddle-wheels of uniform or nearly uniform dimensions throughout is quite wrong. They may, without diminution of strength, be reduced towards their extremities, and ought to be, since every inch of surplus material submerged in them detracts from the work done by the blades. They should taper outwards, as nature tapers the radial ribs in her propellers; but instead of this, the arms of wooden wheels (and there are few as yet of others) are constructed *directly the reverse*. Their dimensions are *increased* outwards; and so general is this practice that it may be considered universal. The Erie, belonging to the New York and Erie Railroad Company, will serve as a fair example. An iron boat, she has wooden wheels 28 feet 8 inches in diameter, with 28 paddles on each, 8 feet 8 inches long, 26 inches deep, and about two inches thick. The arms are oak scantling, 7 inches by 3 where they join the shaft, and 10 by 3 at their other extremities! As there are three to each paddle, one at each end, and one in the middle, the number to each wheel is 84, full one-half of the timber immersed being not only useless, but highly injurious to the vessel's speed. This is not all: a further drag on her is to be found in the rims or large circular stays to which the outer ends of the arms are secured; they are made of timber 5 inches by 5, and as portions are immersed with every paddle, a still larger volume of fluid is displaced. In this boat *four* paddles or buckets are under water at once on each side, three full ones and two halves.

The Galveston's arms are 8 inches by 4 at their outer ends, and the circular braces or rings, 6 inches.

COATING PADDLES WITH MATERIALS THAT REPEL WATER.

If any substance can be found durably to prevent paddles from being *wetted*, they will then carry over less water with them. We coated one set with grease, (suet,) and while the water streamed uniformly over the faces of the others, it adhered only in narrow streaks to these.

Besides the paddles described, some others were tried, but as they involved different principles, and were not of very practical application, their introduction here is not necessary.

CONCLUSIONS.

The lessons which the foregoing experiments teach us are:

That, to render paddles of steamers more effectual, they ought to be fashioned, as far as circumstances sanction, after models furnished by nature, so as to conform to her general practice of contracting surface when resistance is of little avail, and extending it when the latter is greatest, to give the largest portions of blades the longest strokes, at the same time tapering their extremities.

That the fewer the paddles on a wheel the better, provided *one* be always kept in full play; and hence, that it would be more advantageous to point or fork them, as proposed, to evade the jar of their striking on the surface, than so perniciously to split and multiply them, as the popular practice is.

That smooth and thin metallic plates should be substituted for the usual massive water-soaked planks. (At present, perhaps, nothing better than boiler plates, galvanized, could be adopted.) That bolt-heads, nuts, cleats,

straps, and every other projection upon or about them, should be provided against. That the arms of wheels ought to be reduced at their outer extremities, and the immersion of all superfluous material carefully avoided. That, when wheels require balancing, or their momentum to be increased, the weights should be attached to the arms above the surface of the water.

That paddles, and other parts that plunge with them, should be coated with varnish, or some other substance which repels water, in order that the fluid, instead of being dragged up in volumes by them, may roll off, as from the backs of diving birds.

These experiments, it will be borne in mind, have reference chiefly to the *figures* of propelling blades—to determine how far the question of power is involved is another matter, and requires another class of experimental investigations. To do anything well, is to do one thing at a time. After determining the best figure, the next inquiry is the outlay of power; of this, however, we may be certain: as close relationship exists, and the same mutual dependencies pervade, the several parts of artificial as of natural machines, a defect in one member is felt in all. Where figure is distorted or proportions neglected, more or less power is squandered.

ADDITIONAL OBSERVATIONS AND ILLUSTRATIONS.

An abiding conviction of the importance of the subject, and of the value of the preceding experimental results, has elicited the further observations and illustrations which follow.

The principles by which steamers are to be impelled over oceans with rapidity and economy of power, are as definite as any that give effect to a lever or screw, and as fixed and unalterable as those of nature herself. To discover them is the business—the chief business—of the philosophical engineer, and not till this is done can his achievements be free from the taint of imperfection and corresponding failure. It is discreditable that the true outlines of propelling blades have not been determined, and the rather since it is a proof that the full bearing of the question involved has to be felt—that the potential influence of form and proportion in propellers, as well as in the hulls of steamers, has yet to be investigated.

In the following PLATES are a few out of millions of gradations of form—from the slowest to the quickest—which show that the greater the velocity, the longer, narrower and sharper they are; and the converse, as speed is diminished, the shorter, wider, and blunter they become—the same rule applying to ornithologic as to ichthyological organs of motion. There is something exceedingly interesting as well as instructive in marking the changing outline—in observing that fish, e. g., improve in speed as their *rounded and undivided* tails emerge into a *triangular* figure; next, as they become *indented;* and lastly, *lobated* and *pointed*, the quickest of all.

Such appears to be the general process, subject of course to many modifications, in order to meet the requirements of diversified habits and instincts. Still, wherever a fish is seen with a round or roundish and unbroken tail, it may safely be set down as a comparative slow mover; while deeply indented ones are, without exception, indicative of rapid flight.

Round and Roundish Propellers.—The cat-fish, an inhabitant of most of our rivers, common in the Potomac, and its habits well understood, is selected as a fair representative of slow movers, since there are probably as many species inferior to it in this respect, as there are that excel it:—PLATE I, fig. 1. The general contour of this fish does not seem unfavorable to speed; the pro-

pelling blade is also very large in proportion to the body, notwithstanding its movements are comparatively slugged.

PLATE I,

Is dedicated to slow and comparative slow swimmers. Fig. 2 is the caudal fin of the sole, found in most of our Atlantic streams. The propelling blade is here almost a perfect circle, while in the kindred flounders it varies from this to a sharp triangle. The idea of activity or of a moderate speed is never associated with these tribes, nor could it, since they are among the poorest of aquatic rangers.

Fig. 3: The agriopus—a type of blade common to shoals of indifferent swimmers. Not a few of the Chetodons—ocean's butterflies, as they have been named from their brilliant and variegated colors—and other inactive occupants of tropical seas, have propelling oars formed after this pattern. The instrument wielded by the toad-fish of the U. S. coast is not unlike it, only more elongated; while other families have it forming a mean between the two. Both flounders and toad-fish, for lack of speed, often seize their prey by stratagem; covering their bodies in mud or sand, no sooner do their unsuspecting victims come within reach than they are seized and swallowed.

Fig. 4. The pelor of Japan, from Cuvier—another of the toad-fish family. Here the outer rays are lengthened and nearly straight, while the posterior margin preserves the rounded form.

Fig. 5: A perch from Cuvier. The body is apparently adapted for quick flight, and has a large area of propelling blade; but the rule or law assumed is not here violated. This fish is far from being a rapid mover. The form of blade is very common; the curve of the posterior boundary being more depressed than in the preceding, and but slightly more convex than in the jaculator. This last fish is an expert gunner, but an indifferent swimmer. Feeding on insects that hover about aquatic plants, he shoots them with pellets of water ejected from his mouth, and generally with certain and deadly aim. His speed is greater than the preceding, but less than

Fig. 6: The lettered serranus. A type of *triangular blade*, and of quicker swimmers than the preceding; one common to myriads of finny tribes. Convex boundaries have here all but vanished, the exterior rays of the organ being the longest, and the posterior margin nearly a right line. In the striped bass, or rock-fish, and in the Southern kingfish, this margin becomes slightly concave, in which respect they represent a great variety of fishes.

Increased speed accompanies the *triangular* and *indented*. In the yellow perch, fig. 7, this form of outline begins to appear; the posterior margin being cut away so as to present the nuclei of lobes. Now this familiar fish is known to be, what the contour of its propeller declares it should, be far less agile and swift than its kindred and constant associate, the white perch, whose caudal fin is shown at fig. 8. Both are taken at all seasons, in the Potomac. Fig. 9, is the sucker or mullet of the same river, and fig. 10 the smelt, whose caudate lobes are still further brought out, and whose superior activity in the water is known to every angler.

PLATE II.

Lobated and Pointed: On PLATE II. this progressive development of motive lobes is continued up to those of the swiftest of known swimmers. A mere glance at the figures in connection with those just described, will suffice to show how invariably and uniformly speed is accelerated by lengthening and pointing the propelling organs. (The figures are not drawn to one scale.)

Fig. 1: American herring, and fig. 2, the shad—both too well known migrators to need remark. The sketches are, like most of those on PLATE I, from nature.

Fig. 3: The mackerel. A family known to have great power in the water, and to swim with what has been termed incredible energy. It has a wide geographical range—some are supposed to cross the Atlantic from the Mediterranean, and, visiting our coast, are met with from Maine to Florida.

Fig. 4: The dolphin. Accounted among the swiftest of swimmers. Excessively voracious, it hunts its prey with impetuous speed, and is a terrible enemy to flying-fish and other aquatic game. It plays round ships under full sail, and apparently without effort. A specimen in the National Collection measures two feet from the nose to the point of lobal divergence. The lobes are ten inches long, and only one and a half wide at their junction; they are somewhat nearer to each other than in the living fish.

Figs. 5 & 6: The bonita and tunny. Well known marine foragers, from whose theatres of depredation few of their prey can escape by flight. Both are allied to and formed on larger scales after the mackerel model. The lobes are divergent, those of the former nearly at right angles to the body.

Figs. 7 & 8: Sword fishes. The first common in the Atlantic, and with its sharp and elongated lobes, rapid flight is instinctively associated. The momentum acquired by it may be imagined from the fact of its weapon having been repeatedly driven through the solid timbers of ships. The latter is from Cuvier. In these creatures their whole power is concentrated in the caudal fins, and enables them to rush on their prey with the impetus of falling meteors. Of varieties, the East Indian sword-fish figured at large (fig. 9,) surpasses all others in velocity and the force with which it transfixes its victims. The chief use of its high dorsal fin is to steady the body in the line of its flight.

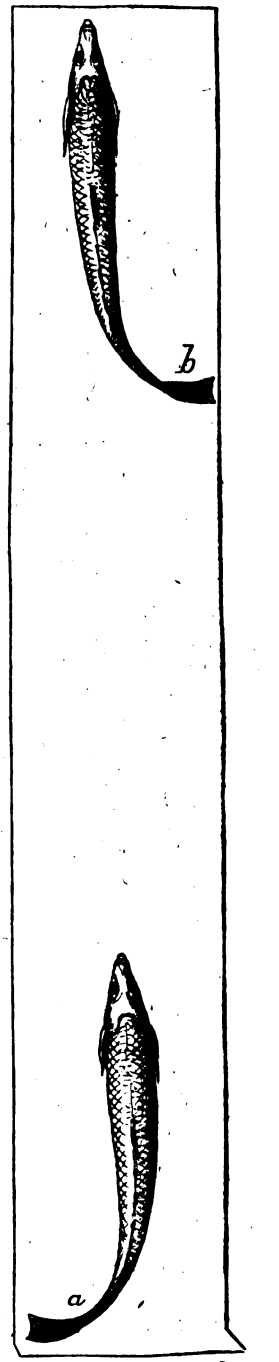
The air and outline of the body of this remarkable creature, with its long, tapering and acuminated propelling lobes, impart universal conviction of its powers of flight, just as the reverse impression is felt on viewing any of the slugged movers. Were the space between its blades filled up, it would at once become one of the latter, and, without an accession of motive energy, one of the slowest among them.

Fish, like birds in the atmosphere, are impelled onward by a succession of impulses. When the fins strike slowly, the resulting starts or bounds are observable; but in high speed the strokes follow each other in such quick succession that an apparent uniformity of motion is the result.

Laying out of view all sculling action, let the broad and undivided lobe *a*—(the lower figure in the marginal cut, page 613) be in the position in which it is prepared to push the fish forward, viz: to unbend and bring itself to a line with the axis of the body. Now in doing this, the extreme posterior margin passes through a greater space in the same time than those parts near the body, and consequently produces the greatest effect. If this margin had no slip, then those parts would be absolute impediments, and a portion of the power would be uselessly consumed in forcing them laterally against volumes of water whose reaction would not further the progress of the fish. Were such organs rectangular and inflexible boards, this would at once be obvious; it would then be seen that the parts toward the body, instead of assisting, would be positive hinderances. What such boards would be to fishes, they are, in fact, to our steamers, although having little dip, the evil is not so apparent in them.

It is conceded that where the organs are very short, this obstruction nearly

vanishes; but with such, high speed cannot be atained for want of sweep, while with long and broad ones it is realized only with a surplus expenditure of vital force. A most beautiful compromise between the two has therefore been devised, viz: *caudate lobes*, in which the central and obstructing portions of undivided blades are removed, the sweep increased, and a maximum velocity obtained with the least possible amount of propelling surface, and at a minimum expense of motive power. This is the way nature makes her fast swimmers, and it is the one by which we should construct ours.



Although the lobe *a*, has been alluded to as describing a curve in the water while unbending itself, in practice it is hardly so; at any rate not when a quick-going fish is at its maximum flight. The organ then acts more like an elastic substance rebounding from a wall; for its action against the fluid is so rapid that the latter has not time to yield ere the fish has shot forward to the second position at *b*, and is in the act of taking another stroke. The lobes, in thus unbending, follow up their first impulses somewhat as do bowstrings the arrows shot from them.

Unequal Lobes. — Those just described enable their owners to progress with equal velocity in all positions, each pair being uniform in dimensions and outlines: but suppose groups should exist whose habits and instincts require them to dart faster through the ocean in some courses than in others: we might then expect corresponding changes in their blades, and such changes should either confirm or shake the positions assumed. Now there *are* those, and among them conspicuous occupants of the deep, which can only fulfil functions assigned them in the economy of nature by travelling quickest in particular directions. How are they enabled to do this? By novel forms or by new arrangements of motive organs? No, but by a device which, like an *experimentum crucis*, establishes the principles contended for.

Fishes that hunt their prey, or escape from their enemies in courses *inclined to* the *horizon*, are provided with unequal blades; those from which increased vigor in the destined directions is to come, being most developed. Thus classes to whom the highest speed is essential in descending, have the superior lobe prolonged; while in such as fly or forage upwards and consequently to whom a maximum of velocity in that direction is indispensable, the inferior one extends beyond its fellow. Furthermore, the degree of inequality is proportioned to the angles formed by the lines of ascent and descent with the horizon. In this very remarkable provision for enabling certain groups to move with the greatest rapidity in the direction most essential to their existence, we have collateral evidence, extensive and emphatic, in support of the proposition that

the more rapid the flight the longer and narrower, within certain bounds, must be the blades of propulsion.

This inequality in motive organs is believed to be unique: nothing like it occurs in other departments of nature. Both wings of a bird or of an insect are uniform—identical in contour and proportions. So also the paddles of swimming birds and of amphibia. In none does one of a pair exceed in dimensions the other. To this singular deviation, so illustrative of artificial as well as natural proportion, PLATE III. is dedicated.

PLATE III.

Fig 1: From Cuvier. The centrolophus. Some mullets have their caudal fins formed after this pattern—the lower lobe slightly projecting past the upper one.

Fig. 2: The Gibbous sucker—common on the Atlantic shores, in which the under lobe protrudes still further, but is exceeded by that of the carp, Fig 3.

Fig. 4: Silver salmon or piabuco of Brazil—from Bloch. 5: The pacu of Guiana, from Nat. Library. 6: Flying fish, the extended lobe being the chief means of enabling it to spring out of its native element. 7: Shark-tailed hypostoma of Guiana—a fish little larger than a herring. The under lobe exceeds the upper in length by at least one half, and is strongly spined at the extremity. In Fig. 8 the disparity is still greater: it belongs to the genus Stromateus.

In the following specimens the order is reversed—the upper lobe it will be seen begins and continues to preponderate. Of Fig. 9, the common bullhead of the Atlantic coast, the caudal fin is long, nearly even and undivided. In 10, the speckled redmouth, cresent shaped, has seventeen rays and the upper lobe extended somewhat more beyond its fellow. In 11, the northern crab-eater, the difference is more marked. This active fish, varying from 20 to 30 inches in length, ranges over a wide extent, being found equally on the coast of Africa and America. Fig. 12, a species of perch from Bloch.

Fig. 13: Ruby-colored etelis, from Cuvier. 14: Mackerel shark, a terrible forager on the family whence its prenomen is derived. 15: The sleeper-shark—the figure represents also pretty accurately the propelling organ of the sturgeon, one of the strongest of swimmers—a blow of its tail has broken a fisherman's leg. The same pattern of blade is seen in the sterlet. Fig. 16: The porbeagle shark from State Natural History, New York. The superior lobe of a specimen caught in New York waters, was two feet long, and furnished with a dilated fin near the tip—the inferior one ten inches. The stomach was filled with fishes. Like most of its relatives it revels among shoals of shad, and pursues with equal success the fleeter mackerel. 17: The shovel-nosed or hammer-headed shark—singular in its contour and dreaded for its boldness, ferocity and velocity. One caught on Long Island shore had its stomach dilated with detached parts of a man, together with his garments.

Fig. 18: The thresher or long-tailed shark, known also as the fox-shark and swingle-tail, is the most remarkable of unequal lobates—the blade often exceeding the body in length. The upper lobe of one in the National Collection is six feet seven inches long, eleven inches wide where it joins the body, and five inches at the middle of its length. The lower lobe only six inches long. In traversing the ocean diagonally—inclined to the horizon—

this animal would undoubtedly beat the East India sword-fish; but in a race laterally the latter would leave the thresher behind.

Sharks exhibit a singularly apparent exception to the law which developes the superior lobe in excess in tribes that seize their food in the act of diving. From the recession of the lower jaw they are compelled to snatch their prey from below; but to do this they turn on their backs or sides, and hence the appropriate elongation of the upper propeller, both for overtaking and grasping their victims.

The saw-fish belongs to the shark family, and resembles the sword-fish in the position and length of its weapon. In full grown individuals the terrible instrument is over six feet in length, and the whole often plunged and buried in the body of the whale. Rushing from a distance and accumulating momentum as it goes, the force acquired has driven the saw through the timbers of a ship.

To contrast the extremes of inequality in lobates still further, the blade of the garfish, Fig. 19, is introduced from a specimen recently caught in the Potomac where they are common. It consists of one lobe only—not a nucleus of an under one is visible. The scales and vertebræ, or muscular part of the body, end by a sweep towards the upper margin, and there vanish. This feature prevailed extensively in remote epochs and the present genus is remarkable as furnishing the only existing representatives of fossil families. Food was probably found chiefly at the bottom of ancient oceans.

Before taking leave of ichthyological propellers, specimens of other varieties given on PLATE I, from figs. 11 to 20, inclusive, may now be glanced at. In them we see how nature cuts away material and alters forms with the nicest discrimination, to meet infinitely diversified habits and movements. Where surface is useless it disappears—where beneficial it is made to shoot forth.

Fig. 11: Black bass, common on the coast from Florida to Cape Cod. It presents a remarkable conformation of the outer boundary which, contributing little if anything to speed, is intended to influence movements, to meet requirements which naturalists may not yet have discovered. In the next figure—12—king-fish, the same feature is more strongly but somewhat differently marked.

Fig. 13: The Brazilian bodian (from Bloch) size of the carp. 14: another variety of sea bass. The next is tridentated, a Chinese carp. 16: the orange file-fish, rarely found in N. York waters. Fig. 17: the larimus from Cuvier, and the nebris has the same form—both of the perch family. 18: another lancet-shaped one, from the same. 19: the long tailed unicorn of New York waters. 20: the horn fish or sea-bull, from Bloch, an inhabitant of East Indian seas—of curious structure, but one singularly ill adapted for speed.

The triangular form is found in amphibia. In seals, (see the adjoining cut,) the hind legs of quadrupeds are thrown back and united at the heels; each foot retains its five toes, which answering the purpose of radial ribs in tails of fishes, give strength and form to the connecting membrane, presenting a blade resembling those of the striped bass and salmon, figured on a previous page, while both produce a tridental posterior margin, and a general outline akin to that of the sea-bass, figured also on the page referred to, exhibiting moreover, a striking likeness to the paddles of swimming and diving birds. In sea-leopards, sea-bears, lions and kindred animals, each foot becomes lobed, furnishing analogues of ornithologic podiceps. From analogy, these creatures should be better divers than seals, but whether they have been sufficiently observed to determine this point, I know not.

Porpoise and Seal.

As the movements of seals consist more in diving than in long lateral journies, the blade is transverse. So it is with whales, which have it lobated. Breathing air, they cannot remain long under the surface without suffocation, hence it is essential that they should have the power of rapid ascent and descent. The tail as well as the body of the porpoise, is adapted to great speed, and with what ease a shoal approaches a ship from a distance, plays round her, and disappears in the horizon, navigators are familiar.

Toads and frogs are other illustrations. The propelling blades of the latter are more pointed than those of the former, and they are known to be by far the best swimmers.

Fore and hind leg of a frog—half the natural size.

Had we been acquainted with frogs only from geological casts, we should have inferred their agility in water from the configuration of the hind feet, and the long jointed rods that wield them. This tribe of batrachians has the reputation of surpassing all four-footed creatures in swimming.

PLATE IV.

The superiority of pointed paddles is interestingly manifested in the musk-rat, figures 1 and 2. This animal in its habits and dimensions, is akin to the ornithorrhynchus, or water mole of New Holland, fig. 3, and although with little or no membrane between its toes, is said, by those conversant with the habits of both, to be much the best swimmer. True, its superiority may be in some slight degree attributable to the use of its tail as a propeller, yet, notwithstanding this, the large undivided membranes of the

foreign animal might have been thought sufficient to secure the advantage. Beavers and otters present other mammalian examples.

Of swimming birds' paddles, fig. 4 is that of the trumpeter swan, which, like most of its kindred varieties, is a powerful swimmer. Even when wing-broken, it passes through the water with great rapidity, and if not otherwise hurt, an oarsman in the best constructed boat can rarely overtake it. Fig. 5 represents those of the gull family—all poor swimmers and worse divers, notwithstanding the expanse of propelling surface. The penguin, fig. 6, leaves them immeasurably behind, with less face of blade. Quick on the water, and quicker under, penguins are thought by some the swiftest of swimming birds. They capture their prey by chasing—not by artifice.

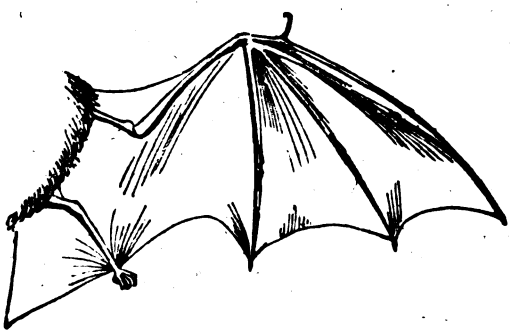
Fig. 7: The Canada goose, and 8 the left foot of the fishing gannet—which bird, while surpassing the gull, does not equal the cormorant in gliding through the liquid element. A cormorant's right and left foot are figured at 10 and 11, the outer toes of the latter being the longest, and thus making the blade more acutely triangular. The gannet, cormorant, and pelican have an additional membranous section—the hind toes in them being fully developed, while a nucleus only is seen in the gull, penguin, and nearly all feathery natants. In the cormorant the area of the inner membrane is slightly larger than the middle, as it also rather exceeds the outer one. In the gannet, this order is reversed.

Fig. 9: A portrait of a cormorant. Of these birds it is remarked; they swim deep and dive with great expertness, so that it is all but useless to follow one when only slightly wounded. At times they swim under water with astonishing speed, pursuing and securing their prey, using their wings as paddles, and their tails as rudders.

Figs. 12 and 13: The grebe, among birds, furnishes an example of lobated paddles. The figures are specimens taken on the Potomac, where they are proverbial for agility and speed, disappearing at the flash of the sportsman's gun, so that ere the shot reach their position they are yards beneath and away from it. With flint locks they are hardly ever hit, and even dodge the best percussion caps. Indentation is here carried so far as to change a propelling blade into three distinct divisions, one governed by each toe. They rarely fly; their wings are imperfectly developed, and they have scarcely the rudiments of a tail. Water is their proper element, and in the levers by which they work their paddles, a remarkable display of design is manifested, in so shaping the bones of the legs as to impart the greatest strength with the least material, and of such a form as to encounter the least resistance in the direction in which they act. In the figures exhibiting this feature 13 is a side view, and 12 a front one; hence the section, instead of a circle, as in other birds, is rather like that of a knife blade. In grebes, penguins, and cormorants, the legs are placed far behind, so much so that, to preserve the centre of gravity when standing on shore, they have to throw their bodies in a perpendicular position.

The fact is as full of significance as any fact connected with the subject can be, that, of all known varieties of soaring and natant propellers, existing or extinct, none can be quoted to conflict with the views urged in this essay. On the contrary, the closer they are examined the clearer becomes their testimony, and the more conclusive. Were they applicable to organs moving in one medium only, they might be questioned; but we find nature sanctioning them in aerial as in aqueous motive implements. She adheres to them everywhere.

Bats, connecting quadrupeds with birds, have a large sheet of wing, composed of angular and pointed divisions. Their movements in the air resemble those of butterflies, and, although quick in changing their direction of flight, they cannot be classed among swift soarers. Both they and lepidopters illustrate the fact that speed does not depend upon a large expanse of wing, so much as upon *form*. It is this that exercises a controlling influence. From examples given in PLATE VI. it will be found that the fleetest of birds, as well as of fish, are indebted more to contour and length of blade than to surface.

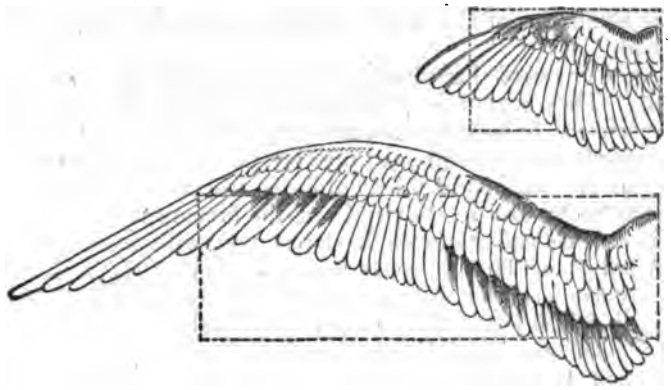


Carolina bat's wing, half the natural size.

Frugality in outlay of material, and consequently of power, is seen in every piece of mechanism turned out of nature's workshop. Sufficiency without surplus—enough and not an atom over—are proverbs with her. An example worth mentioning occurs in bats. In flying organisms the tail is a rudder by which changes in the direction of flight are more or less promptly attained. It is so with bats, most of which prey on flies, which they hunt and swallow on the wing; but some feed on fruits, and these, requiring no such steering apparatus, have none.

Among entomological illustrations are the sharp angled wings of butterflies, as the Jasius genus, known to surpass cognate tribes in flight. Of insects whose organs may be classed among lobates, is the sphinx, or hawk-moth family, remarkable for narrow and elongated wings. Then there is the boldest, fleetest, and most voracious of insectivora, the dragon-fly, preying on bees, wasps, and hornets, and far more readily overtaking butterflies, notwithstanding their broad expanse of wing. This fiercest of hunters has been described as darting from angle to angle with the velocity of thought, and as rapidly darting back—not turning in the air, but with a clash reversing the motion of its propellers.

In the next cut, a wing of the partridge and one of the frigate bird, *both of a width*, are placed together, illustrating the difference of form and proportions in the wings of slow and quick flyers: the latter extending further into the resisting medium than the former, agreeably to the universal rule in air as in water propellers, *increased speed* invariably accompanying *increased dip*, and vice versa—a rule we have not attempted to follow in our steamers, and hence the comparative failure of our labored efforts. We cripple the flight of domestic and other birds by cutting portions from their pinion feathers. So far as flying is concerned, a partridge may be considered a frigate bird with its wings clipped; and the cod a dolphin with its caudate lobes truncated.



Wings of the partridge and man-of-war bird.*

For vigor and activity of wing the *tern* families are celebrated, and there is a strong resemblance in the conformation of their wings and tails to those of the tropic bird; the arctic jager, a most active plunderer, no sooner perceives a gull to have made a successful plunge, than he pounces on and makes it yield its prize. His wings are long, narrow, and very acute: so are those of the shearwaters, a class of oceanic plunderers whose flights are extremely rapid and protracted. See fig. 5, PLATE VI.

PLATE V.

Naturalists have long since pointed out the fact that the power of flight in birds depends on the shape and structure, not on the area, of their expanded wings. These organs have been arranged under six different heads, and in the following order: acuminated, falcate, pointed, rounded, ample, and abortive—a division too minute for popular illustration. Acuminated, i. e., long, tapering, and sharply pointed wings, "are those adapted for the most rapid and long continued flight." Examples of this form are seen in the oceanic genera, and among land birds the swallow is a familiar example; another is furnished in

Fig. 1. The swallow-tailed hawk. The flight of this elegant species, says Audubon, is singularly beautiful and protracted. It moves through the air with such ease and grace that it is impossible for any individual who takes the least pleasure in observing the manners of birds, not to be delighted by the sight of it on the wing. Gliding along in easy flappings, it rises in wide circles, to an immense height, inclining in various ways its deeply forked tail, to assist the direction of its course; dives with the rapidity of lightning, and suddenly checking itself, reascends, soars away, and is soon out of sight. At other times a flock of these birds amounting to fifteen or twenty individuals, is seen hovering around the trees. They dive in rapid succession amongst the branches, glancing along the trunks, seizing in their course the insects and small lizards of which they are in quest. Their motions are astonishingly rapid, and the deep curves which they describe, their sudden doublings and crossings, and the extreme ease with which they seem to cleave the air,

*The proper proportions have not been preserved in the above cuts. The former is too long, and the other too short. To Titian R. Peale, Esq., one of the naturalists of the Exploring Expedition, and *now an examiner* in this office, I am indebted for some of the preceding illustrations.

excite the admiration of him who views them, while thus employed in searching for food.

Of falcated or sword shaped wings, humming birds afford numerous diverse specimens. They have little or no taper, except at or near the tip.

As a specimen of pointed forms, the wings of the chief of feathered races—chief as regards size, strength, and the elevation of its flight—may be quoted. Breeding on the summits of the Cordilleras, inaccessible to man, the condor cruises at altitudes lost in the depths of the firmament to human vision, but whence it watches and darts on its forest prey with the swiftness of lightning. A full grown bird measures from the point of the beak to the end of the tail only five feet; but from the tip of one expanded wing to that of the other, nearly *fifteen* feet. The velocity of its flight and the acuteness of its sight and smell may be inferred from an observation of Von Tschudi—"When a bait is laid, it is curious to observe the number of condors that assemble in a quarter of an hour, on a spot near which not one had been previously visible"—arriving from opposite parts of the horizon, and some from distances apparently below it. The largest, and it is presumed the heaviest of birds, dwelling in so rarified a medium as the Andes, and careering in strata still more attenuated, is a significant fact to the engineer—significant as showing how the propelling organs of this bird launch out into the medium it moves in; i. e. how increased dip, with increased weight, bulk and velocity is kept up.

Fig. 2: The argus pheasant, remarkable for a superabundant development of wing, and yet among the poorest of flyers. The body is not larger than that of an ordinary fowl, but its length from the beak to the end of the tail is over five feet, the tail feathers being three feet eight inches. Its general aspect does not strike one as unfavorable to moderate velocity, yet it not only rises with difficulty, but its flight is heavy, and kept up only over short spaces. In this bird we have an example of blunted or rounded wing united with ample surface, and attended with very imperfect results.

Fig. 3: One of the wrens, birds whose flight is short and slow. Fig. 8: the domestic fowl, is another example of rounded wing, and, as usual, is associated with laborious and indifferent flying. The gallinaceous or rasorial birds are intended to abide principally on the ground—hence their toes are arranged for walking and running, while their organs of flight are less powerfully developed—their wings are short, and like all short wings, are rounded. Birds of this order, as the Guinea-fowl, turkey, peacock, &c., have all short and blunted wings, and consequently are described as possessing in a very imperfect degree the faculty of flight.

A specimen of abortive wings is shown at fig. 4. The organ in the ostrich is a large circular blade, which never raises the bird from the ground. The mallard or wild duck, fig. 5, is a type of the pointed form; few birds so heavy have so small an amount of propelling surface, yet they travel with great velocity, and their migrations extend from the tropics to the polar regions. With slight variations the wings of parrots and many smaller birds resemble these. The passenger pigeon, fig. 9, belongs to the same class; a bird proverbial for its long and rapid progress across the firmament. They have been killed near the city of New York with their crops full of rice collected in the plantations of Georgia or Carolina; and as this food is digested by them entirely in twelve hours, they must have travelled three or four hundred miles in about half that time—sped through the air at the rate of a mile a minute.

The greatest powers of flying are enjoyed by the different groups belonging to or representing the natatorial order, to which alone those are confined that catch their food in the air—albatrosses, frigate-birds and petrels are consequently among the most expert flyers of feathered races. In the fissirostral tribe we see the same faculty given in a pre-eminent degree to swallows, swifts, night-jars, bee-eaters, &c.

Figs. 10 and 11: Examples of acuminated wings, the most perfect specimens of which are seen in the oceanic genera. Fig. 11 is the tropic bird, celebrated as a remarkably rapid courser, but having a development of rudder unfavorable to quick evolution, its flights are generally direct. Like the frigate-bird, it is found soaring over the remotest parts of the ocean. The wings are described as long, acute; primaries strong, tapering—the first quill longest, and the rest rapidly graduated; the tail of twelve feathers—the two middle ones extremely elongated.

Fig. 12: The frigate pelican, or man-of-war bird, which has been instanced among the most powerful soarers in creation. The figure is from nature—a specimen in the National Collection. The organ is three feet two inches long, and eight inches at the greatest width. The body of the bird, from the point of its bill to the fork of the tail, is twenty-two inches, and to the extremity thirty inches. The speed of this bird is proverbial, and, by means of its double rudder, it changes the direction of its flight with marked celerity—a property the albatross has not, because of its short, broad tail. Hunting within the tropics, such is its power of flight that the air would seem to be its theatre of rest as well as of activity, since it is scarcely ever seen reposing on the water. A pirate by profession, it watches the movements of gulls, tropic birds, boobies, &c., and, soon as they rise, compels them to drop their prey, seizing it as it falls.

Audubon has some interesting memoranda. The wings, he observes, are extremely long and pointed—the first quill longest, the rest rapidly diminishing; the tail very long, deeply forked, of twelve feathers. When incubating, their long wings and tails are seen extending beyond the nests for more than a foot. Those about the Florida Keys are seen passing with the swiftness of thought over trees, and snapping off, as they fly, dry twigs for their nests, with a single grasp of their powerful bills. Only two other birds he knew perform such a feat—the forked-tail hawk and the swift or chimney swallow—but neither are so expert as the frigate pelican. Sometimes this bird drops a stick while travelling to its nest: when this happens over water, it plunges and recovers it before reaching the waves. Mr. A. thinks this bird possesses a power of flight superior to any other. However swiftly the cayenne tern, the smaller gulls, or the jager move on the wing, it is a matter of mere sport for the frigate-bird to overtake any of them. The gos-hawk, penguin, and gyr-falcon—the swiftest of our hawks—are obliged to pursue a green-winged teal or passenger pigeon at the highest pitch of their speed, and at times for half a mile, before they secure it; but the frigate-bird comes on it with the velocity of a meteor.

Fig. 13: A wing of the wandering albatross—a bird for endurance of flight probably unrivalled. Found over all parts of the Southern ocean, it seldom rests on the water, save in calm weather. During storms, even the most terrific, it is seen, now dashing through the whirling clouds, and now serenely floating, without the least observable motion of its outspread pinions. The figure is from a specimen in the National Gallery, in which the length exceeds

4 feet—the breadth at the widest part being only 8¼ inches. The lower edge of the organ is composed of a single row of feathers, forming an outline thin and sharp; while the upper, or front part, is 1¼ inches thick with bone, covered with numerous layers of plumes. At the last joint, towards the tip, the thickness is over an inch—the transverse section resembling that of a razor-blade. The tail is only 10 inches wide at the widest, and 8 inches long from the root.

The two central figures of the plate, 6 and 7, are the partridge and the black tern; they serve to contrast the rounded with the acuminated form—one of the poorest with one of the best of flyers. The career of the tern is graceful, light and extremely rapid. During autumn they hunt for food over the wet prairies, skimming along and picking what they find, without lighting. Between them and the partridge the contrast is as striking as that of the jager and the argus pheasant. The wing of the partridge extends not to the end of the rump, while that of the other is at least double the length of its body.

PLATE VI.

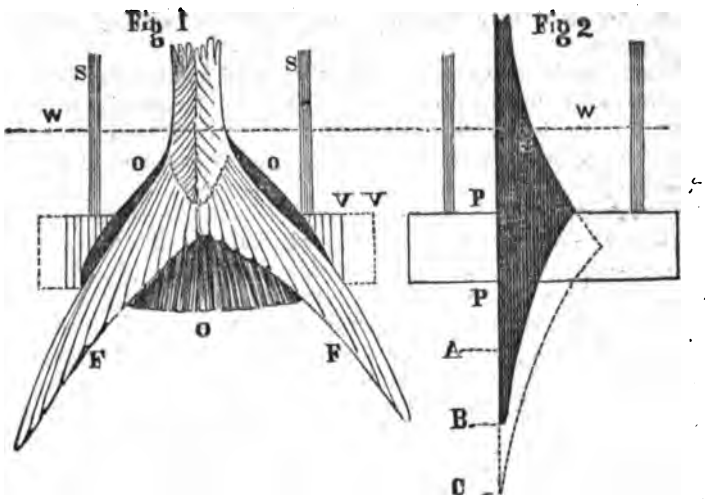
In PLATE VI the figures are designed to contrast the contour of *our* paddles and the connection of their broad sides to the levers that work them, with those shaped and joined by the UNERRING ARTIFICER. Some minds are awakened only by extremes of dissimilitude, when a glance often does that which ordinary reasoning fails to accomplish.

Let it not be imagined that anything like caricature is here intended: the purpose is simply to make manifest to the eye the difference between the perfect and imperfect; and *that*, under all circumstances, in philosophical or mechanical disquisitions, is not only justifiable, but useful; at least to those who are more readily convinced through the senses than the intellect alone. Admitting a very wide distinction between a natural and an artificial organ, still, were a parallelogram or a square a legitimate propeller, in the highest or lowest scientific sense of the term, its absurdity, when applied as represented in the plate, could not be so apparent—so repugnant to reason and to ordinary apprehensions.

The laws of propulsion are founded in nature; nothing can change them—nor will they yield a jot or a tittle to our pre-conceived views and opinions. The idea of extending paddle-blades 20 feet and upwards from a vessel's side—to make them what they are, in fact—"flash wheels"* skimming up water from the surface, instead of obtaining increased hold by increased depth close by the vessel—is one so unphilosophical, that it probably will not be sanctioned much longer.

From the foregoing, it is most manifest, that nature's plan of increasing speed in aqueous organisms, is antipodal to ours—that ideas which prevail with her are wide of those by which our engineers are governed. An additional illustration or two to this point, and the subject is left to those whose interest it is to pursue it.

* Used for throwing water up slight elevations, for irrigational purposes.

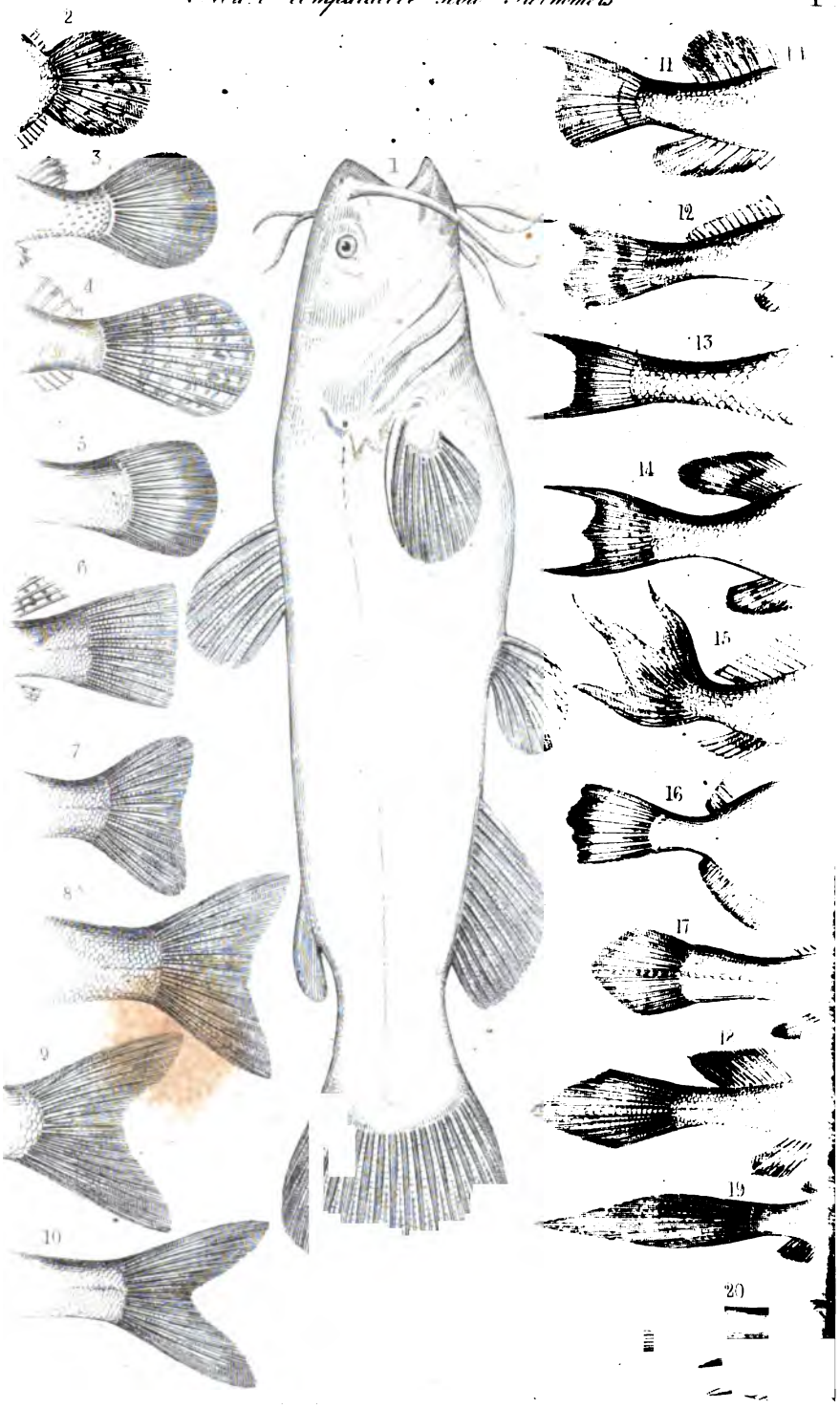


Let the dark triangular part of the figure (1.) o, o, o, be the caudal paddle of a jaculator, fresh water bass or cod—all slow swimmers. Now, the problem is, to make the same amount of propelling surface give double or treble velocity to other fish of equal or even greater bulk—to impart, for example, the speed of the dolphin to a cod. How is this done? Why, invariably, by bifurcating it and employing the material removed to *extend the lobes* as at F, F. The propelling lever now extends further from the fulcrum, and consequently has not only greater hold on the water, but makes a larger stroke or sweep through it.

Suppose W, W, the water line, and the parallelogram V, V, a steamer's blade, attached to the arms S, S. The vessel's speed is required to be increased. How is it attained? Almost always by adding to the surface laterally at V, V. Thus, as has been remarked, the ocean steamers now in progress in New York—supposed to embrace every possible improvement—have the paddle planks 14 feet (some boats have them 22 feet!) stretching that distance from each side of the vessels; as if half the surface, disposed after nature's mode, would not be equally efficient and with the *same power;* for, saving of power is as essential a result of improvement in form, as of approaching the truth in any other particular.

Suppose P, P, fig. 2, represent one of these enormous blades about to be enlarged to make a vessel go faster, is it not apparent that by altering its figure to that shown by the dark tint, the rule of nature being followed, superior results must ensue; and this not by adding to, but actually dispensing with about one-half of the propelling surface. Were the boundaries extended to the dotted lines, the area would still be nearly one-third less than the original. In this type of blade a quality unknown in common ones is revealed, viz: every horizontal section bears a like amount of strain, and contributes equally to the work done, although the areas differ so materially; thus the portion included between the lines A, P, from the larger sweep it has to take, equals the larger portion between P, P; and for the same reason the section A, B, equals A, P;—*increased range compensating for diminished surface.**

*This is a point which, I believe, no engineer has yet brought out. The idea is a new one in artificial propelling.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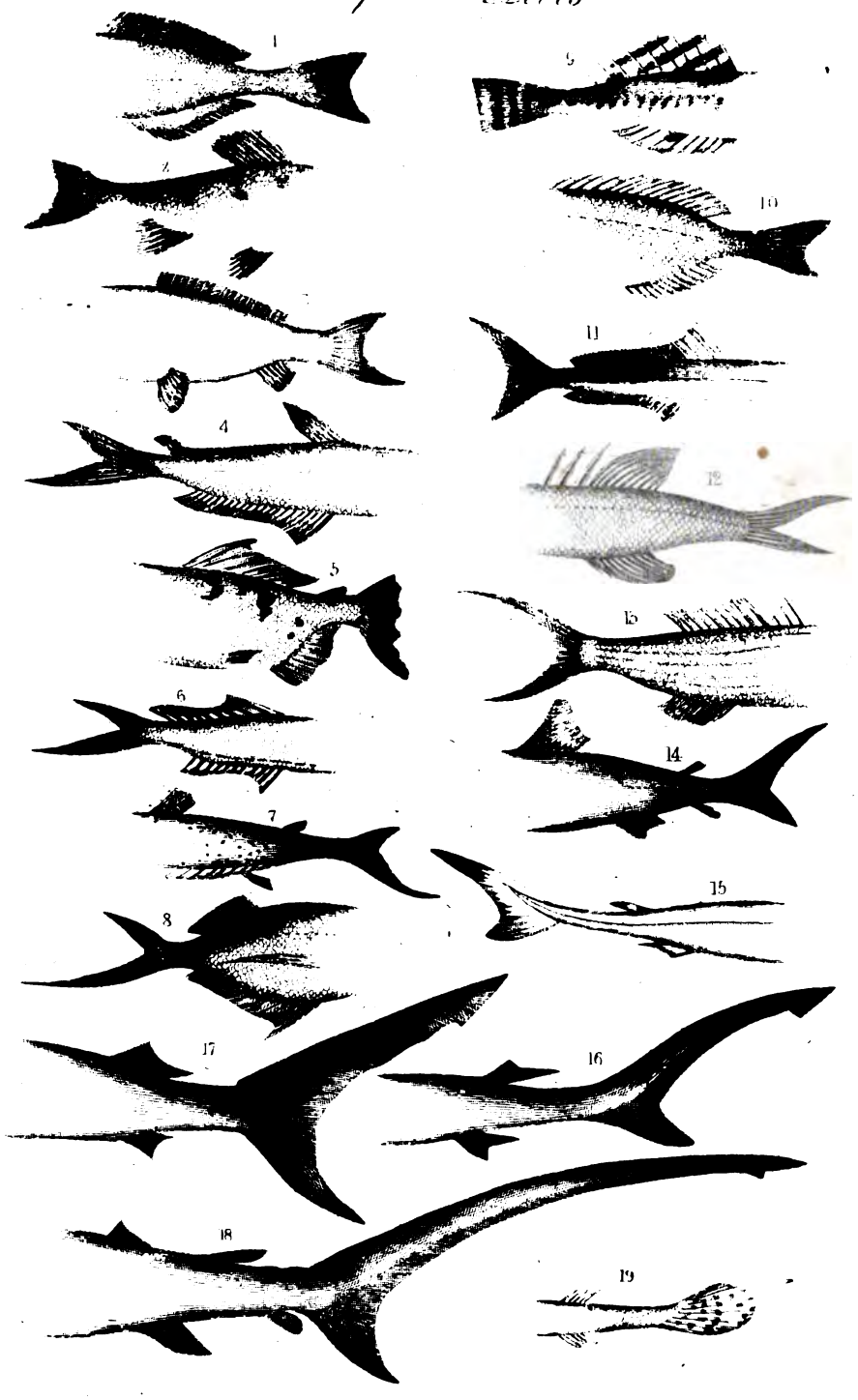
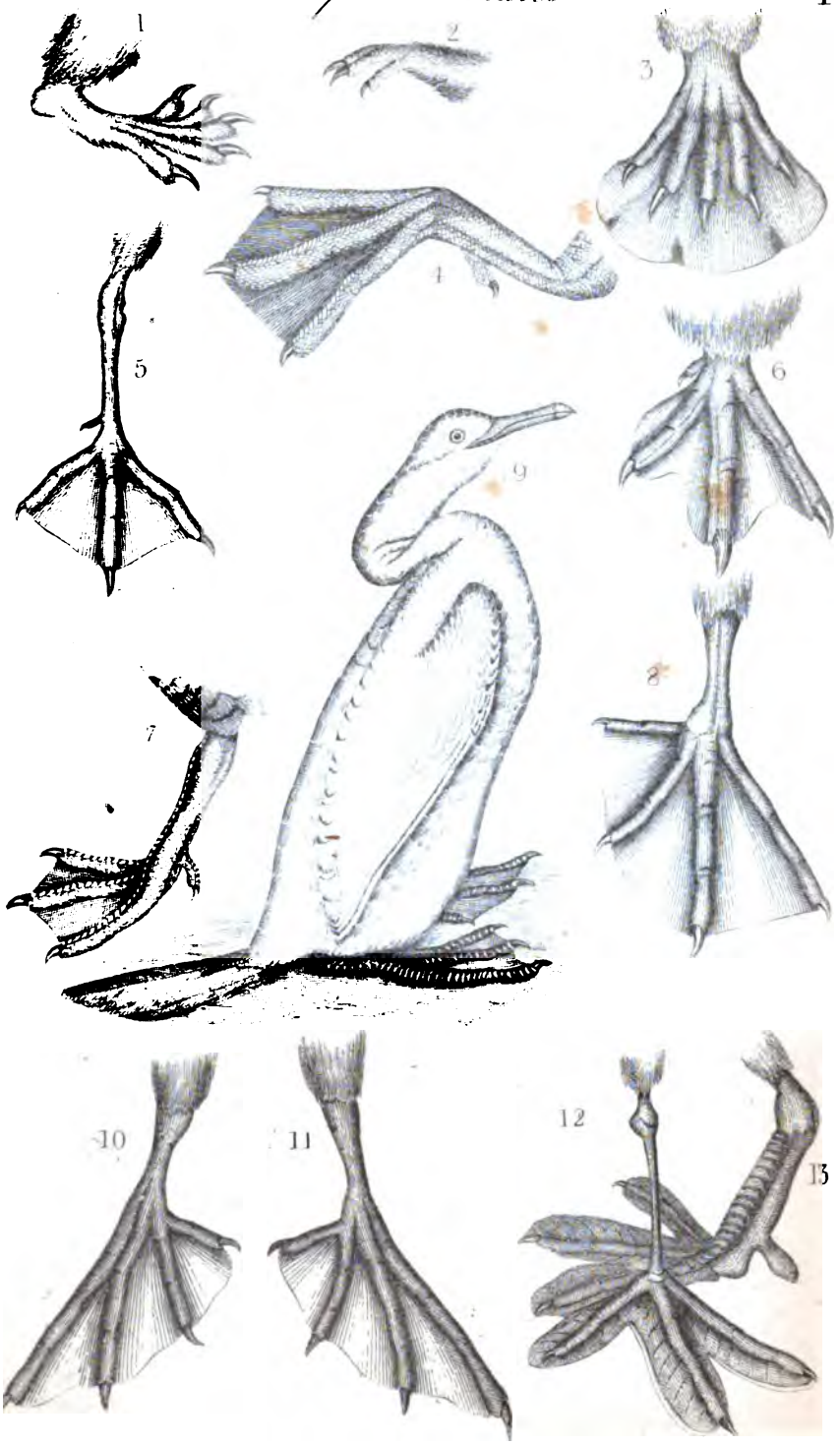
Unequal Lobes

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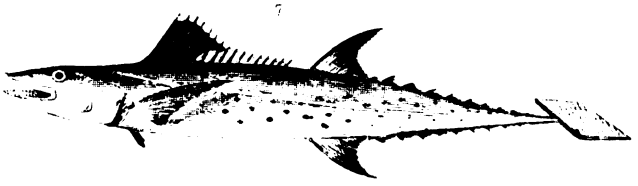
Natural contrasted with artificial Propellers.



CONCLUDING REMARKS ON PROPELLERS.

From the specimens of nature's propellers quoted, (and they represent countless millions from every division of the animated kingdom for which air and water are the theatres,) we see that those creatures possessing the powers of locomotion in the greatest perfection are urnished, not with remarkably *large propellers*, but with long, narrow, and pointed ones—in no case bounded by straight lines. There is a meaniug, a deep meaning, too, which engineers have not yet perceived, in this absence of rectangular and right lined boundaries—this lengthening, forking, and pointing—this uniform effort at angularity.

If it be conceded that nature is an exponent of the Divine Inventor's ideas, and consequently of the truest philosophy of mechanics—that as an economist of power and material she cannot be excelled; and in the forms, adaptations, and results of her machines, she is absolutely perfect—does it not become us to consult her on a subject which she has so profusely illustrated, and attend, as it were, to one course, if not more, of her lectures?

If she has nowhere adopted the figure of our steamers' buckets, (nor anything like them,) in the multiplicity of her submerged propellers, nor in her surface paddles, nor in the motive implements of amphibia, nor in the countless swarms of minute aqueous beings—if, so far from approaching, she has carefully avoided it in her swimming and diving myriads, from the leviathan of the ocean to the minnow of brooks and the animalculæ of our cisterns—what are we to think? That she is chargeable with awkwardness in her work, and ignorance in the selection of means proper to her end? and that the shape we have contrived for urging both large and small bodies through water is better than any of hers? Or, shall we not rather confess that in adhering to ancient practice* we MAY be wrong; and resolve, instead of blundering on longer in the dark, to consult her at once, by testing her forms and proportions against ours?

Then, what is still more eminently significant, she confines not her favorite principles to water, but displays them in as high relief in another fluid; as if to show us, by endlessly diversified organisms sporting in different media, the demonstrations of her plans. In the wings of birds, bats, insects, and every aerial soarer, from the condor to the mosquito, as also in the feet of water fowl, from the largest to the smallest, the quickest to the slowest, she tenaciously holds on to *angular forms* and *pointed extremities;* thus elucidating and enforcing her views of the doctrines of propulsion, as relates to both air and water, by arguments enchanting and conclusive.

Admitting, to the fullest extent, that artificial organs can seldom follow literally the contours of natural ones, still is it not remarkable that in the *infinity* of her modifications of propelling blades, she has rejected everything like a parallelogram or a square; and has, moreover, *never* united the broadside of one to the body that it is to move, or to the levers that are to work it—on the contrary, making the connexion invariably an an angle!

To the last remark it may be objected by the querulous that the *sciurus*

*Our steamers' wheels differ in nothing material from those used ever twenty centuries ago in Roman galleys. In early printed books the blades of paddle-wheels are figured as now. See the Nuremberg Chronicle of 1493; Rivius' German Translation of Vitruvius in 1548; and editions of Valturius, and other old writers on military affairs.

volans is an exception. Not so; this, though named one, is not a flying animal, the expansion of skin uniting the fore and hind legs is a buoyant, not a motive implement. It has no play, but merely serves to keep the little creature from descending as quickly on taking a leap, as it otherwise would. Whatever slight progression it makes on passing from one tree to another, over and above what is due to the spring taken at starting, is ascribable to the sinuous or sculling motions of the tail, and this application of that member accords with what naturalists tell us of companies of voyaging squirrels of Lapland, crossing in calm weather rivers, and even extensive lakes. Each individual launches and manages its own canoe—a piece of bark—using its tail as a propeller, and the air as a resisting medium.

There are those who smile at the idea of engineers and machinists studying Nature's contrivances; and such, on perusing the preceding suggestions, will deem it a sufficient reply to remind the proposer that steamers are not black-fish, nor paddles salmons' tails or petrels' feet. But minds differently organized think a glance into her work-shops is never amiss, and that the longer the visit the better for the visiter, since there is no art or contrivance—and it is certain that through eternity there never can be one—which has not its prototype in her collections. If we find them not, it is because of inattention, or an imperfect acquaintance with her stores. Perhaps we know not at which of her ateliers to inquire, or are not prepared to appreciate specimens laid before us when we enter.

As already intimated, no person expects to find in living mechanisms exact copies for artificial articulations; but when a mechanical principle, and the instruments through which that principle is manifested, are before us—when we see motion communicated to a class of organs, comprehend their construction, effect of their forms, modes of their action, and dynamic results—there is no difficulty in making such deviations, as difference in materials, powers to be employed, and conditions under which the artificial machine is required to act, may require. It is the perfection of invention thus to *imitate* Nature—the maturity of science and art to tread in her steps.

There is matter of the highest interest and deepest curiosity in this subject of natural propellers. To any single division folios might be dedicated; every step taken in the investigation being attended with the revelation of new truths in mechanical science.

Respectfully submitted:

THOS. EWBANK.

WASHINGTON, January 16, 1850.

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